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INVESTIGATION OF CONCENTRATION OF ECONOMIC POWER

TEMPORARY NATIONAL ECONOMIC COMMITTEE

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FULL AND COMPLETE STUDY AND INVESTIGATION
WITH RESPECT TO THE CONCENTRATION OF ECONOMIC
POWER IN, AND FINANCIAL CONTROL OVER,
PRODUCTION AND DISTRIBUTION
OF GOODS AND SERVICES

MONOGRAPH No. 8 TOWARD MORE HOUSING

Printed for the use of the
Temporary National Economic Committee



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MONOGRAPH NO. 8

TOWARD MORE HOUSING

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ACKNOWLEDGMENT

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(Signed) JOSEPH C. O'MAHONEY,
Chairman, Temporary National Economic Committee.

TABLE OF CONTENT

PART I

SOME ECONOMIC ASPECTS OF HOUSING

	Page
Letter of transmittal.....	XIII
Summary and conclusions.....	XV
Housing finance.....	XVI
Collusive practices.....	XVIII
Research.....	XIX
Public housing.....	XIX

CHAPTER I

Construction and the general economy.....	1
Volume and employment.....	2
Relation to other industries.....	3
Investment outlets.....	8

CHAPTER II

Trends in nonresidential and public construction.....	11
Private nonresidential building.....	11
Private utilities construction.....	14
Public construction.....	16

CHAPTER III

Market factors and needs in residential building.....	19
Population requirements.....	20
The estimated need versus the current rate of building.....	21
Relation of incomes to rents and costs.....	22
Rent and ownership.....	27

CHAPTER IV

Operation of the building industry.....	31
Real-estate dealers.....	33
Architects and engineers.....	34
Contractors.....	35
Subcontractors.....	36
Material dealers and manufacturers.....	38
Local building ordinances.....	39
Financing and related functions.....	39

CHAPTER V

Housing costs.....	41
Labor.....	47
Materials.....	59
Collusive bidding practices.....	69
Fees and miscellaneous costs.....	72

CHAPTER VI

Housing finance.....	77
Interest rates.....	80
Government lending activities.....	83

	Page
CHAPTER VII	
Land, taxes, and building codes.....	93
Land.....	93
Taxes.....	97
Building codes.....	99
CHAPTER VIII	
Technical trends.....	103
Economy of design.....	103
Research in design and materials.....	105
Prefabrication.....	108
CHAPTER IX	
Public aid to housing.....	111
The limited dividend and tax exemption.....	111
Subsistence homesteads.....	112
P. W. A. housing.....	114
United States Housing Authority.....	116
W. P. A. housing.....	117
PART II	
THE RELATION OF PRODUCTIVITY TO LOW-COST HOUSING	
Letter of transmittal.....	121
Introduction.....	123
Construction in the national economy.....	125
Organization of the building industry.....	126
Productivity and costs.....	130
Need for scientific industrial research.....	141
Recommendations.....	145
Appendix A.....	149
Appendix B.....	153
Appendix C.....	165
Appendix D.....	173
Appendix E.....	175
Index.....	207

SCHEDULE OF TABLES, CHARTS, AND EXHIBITS

TABLES

PART I

	Page
I. Estimated volume of private nonresidential building, 1925-38.....	11
II. Volume of commercial building—37 Eastern States.....	12
III. Private utilities construction by types, 1925-38.....	15
IV. Public construction in the United States, 1925-38.....	17
V. Residential construction and total construction in the United States, 1925-38.....	19
VI. New nonfarm residential building in the United States, estimated volume, 1920-39.....	23
VII. Distribution of nonfarm families by income groups, 1935-36.....	24
VIII. Number and value of homes constructed in the United States in 1938 relative to income groupings.....	25
IX. Building costs per room on rental housing.....	42
X. Break-down of costs on a \$4,800 house for sale in 1939.....	43
XI. Financial statement of basic house.....	46
XII. Average annual wage payments and percentage skilled workers of all wage earners, by manufacturing industries and the construction industry, 1929.....	52
XIII. Residential building activity and average wage rates of skilled workers in 1936.....	55-56
XIV. Indexes of costs in the construction of a standard 6-room frame house.....	60
XV. Lumber costs at Chicago, Ill., code period January to March 1934.....	65
XVI. Land costs on multifamily residential construction.....	95
XVII. Allowance to be added to glass size ordered for finished window openings.....	104
XVIII. Maximum cost of constructions for samples submitted for testing in National Bureau of Standards research program.....	106-107

PART II

A. Comparison of net earnings and expenditures of the United States Steel Corporation, 1904-38.....	149
B. Income and operating expense per room per month, and operating and capital costs in relation to gross annual income, for 39 New York apartment buildings—1937.....	150
C. Prices of five principal construction materials—1937.....	151-152

CHARTS

PART I

I. Value of all construction, 1919-39.....	3
II. Manufacturing employment, durable and nondurable goods group 1923-39.....	4
III. Employment and pay rolls, steam and hot-water heating apparatus and steam fittings, 1923-39.....	4
IV. Employment and pay rolls, lumber—sawmills, 1923-39.....	5
V. Employment and pay rolls, lumber—millwork, 1923-39.....	5
VI. Employment and pay rolls, structural and ornamental metalwork, 1923-39.....	6
VII. Employment and pay rolls, brick, tile, and terra cotta, 1923-39.....	6

CHARTS—Continued

PART I—continued

	Page
VIII. Employment and pay rolls, cement, 1923-39.....	7
IX. Employment and pay rolls, plumbers' supplies, 1923-39.....	7
X. United States Steel Corporation earnings and new construction, 3-year moving average, 1904-38.....	13
XI. Effect on monthly carrying charge of a 20-percent reduction in labor, materials, and interest and amortization.....	48
XII. Comparison between building-materials prices and all commodities wholesale prices, 1913-37.....	58

PART II

I. Retail and wholesale prices of portland cement.....	153
II. Retail and wholesale prices of short leaf yellow pine.....	154
III. Retail and wholesale prices of Douglas fir.....	155
IV. Retail and wholesale prices of common brick.....	156
V. Retail and wholesale prices of hollow tile.....	157
VI. Retail and wholesale prices of steel reinforcing bars.....	158
VII. Retail and wholesale prices of structural steel.....	159
VIII. Retail and wholesale prices of crushed stone.....	160
IX. Retail and wholesale prices of building sand.....	161
X. Retail and wholesale prices of hydrated lime.....	162
XI. Retail and wholesale prices of cast-iron soil pipe.....	163
XII. Net effect upon housing costs of identical reductions in each component.....	176
XIII. Proportion of national income spent for homes and automobiles.....	178
XIV. Major participants in the construction of a single family house in an urban area.....	faces 178
XV. Distribution of employers and employees by size of business con- cern, contract construction industry, 1938.....	181
XVI. Distribution of work performed, by location, contract construction industry, 1935.....	183
XVII. Sales distribution of manufacturers in selected industries, 1935.....	185
XVIII. Sales distribution of wholesalers in selected kinds of business, 1935.....	186
XIX. Sales distribution of manufacturer's wholesale branches in selected kinds of business, 1935.....	187
XX. Labor processes required in house construction.....	faces 189
XXI. Average inventory value of equipment per employee in the con- tract construction industry, 1929.....	193

EXHIBITS

PART II

1. Net effect upon housing costs of identical reductions in each component.....	175
2. Property valuation of new single-family homes insured by F. H. A. during 1938.....	177
3. Annual income of F. H. A. mortgage borrowers during 1938—new single-family homes.....	177
4. Family incomes in the United States, 1935-36.....	178
5. Percent of the national income produced by the contract-construction industry.....	178
6. Percent of their 1929 income produced by major industry groups.....	179
7. Same as chart 14.....	179
8. Number of employers and employees in the contract-construction industry, 1938.....	180
Distribution of employers and employees in the contract-construction industry by size of business concern, 1938.....	180
9. Value of work performed by contract-construction establishments, 1935.....	182
10. Same as chart 16.....	182

EXHIBITS—Continued

PART II—continued

	Page
11. Includes charts 17, 18 and 19.....	184
12. Branch offices of contract-construction establishments, 1929.....	188
13. Membership in trade associations of contract-construction establishments whose volume of business exceeded \$25,000 in 1929.....	188
14. Number of national and interstate trade associations in the construction field classified by major industrial groups, 1938.....	188
Number of national and interstate regional trade associations in the construction field classified according to the percent which their membership represents of the total number of firms in the industries covered by them 1937-38.....	189
15. Same as chart 20.....	189
16. Productivity in blast furnaces, 1929.....	190
17. Index of productivity in the electric-lamp industry.....	190
18. Index of productivity in the automobile-tire industry.....	190
19. Index of productivity in leather industry.....	191
20. Average inventory value of equipment in the construction industry by class of establishment, 1929.....	191
21. A few examples of union restrictions upon apprentices.....	194
22. Full text of the statements referred to in the text regarding Baltimore and Pittsburgh plumbers.....	195
23. Full text of the jurisdictional agreement over the installation of Acoustone.....	195
24. Actual time reductions on various carpenter operations.....	195
25. Savings through planning on 30-house project.....	196
26. Detailed data regarding several of the cases involving building materials dealers before the Federal Trade Commission.....	196
27. Number of people engaged in retail distribution of building materials and new automobiles, 1935.....	200
28. Indictments which have been returned and civil suits which have been instituted in the building industry under the current program of the Department of Justice under the antitrust laws.....	200
29. Outlay for research \$215,000,000 in 1939.....	202
30. Excerpts from testimony of Robert L. Davison, director of housing research, John B. Pierce Foundation, New York, before the Temporary National Economic Committee, July 13, 1939.....	204

PART I
SOME ECONOMIC ASPECTS OF HOUSING

By
PETER A. STONE

LETTER OF TRANSMITTAL

HON. SENATOR JOSEPH C. O'MAHONEY,
Chairman, Temporary National Economic Committee,
Washington, D. C.

MY DEAR SENATOR: Idle men and idle money are problems, industrially and regionally, of greatly varying intensity. While the whole economy suffers, the malady is one leaving some parts of the economy unaffected while others are afflicted with unusual severity. To a surprising extent the problem of depression is one of inactivity in construction and housing. To no small degree the job of getting idle men back to work and of finding an outlet for idle funds is one of reviving home building.

Accordingly, the Temporary National Economic Committee, after holding extensive hearings from June 27 to July 14, 1939 (reproduced in Part 11, Hearings Before the Temporary National Economic Committee) requested that a systematic analysis be made of the factors impeding home building. Such an analysis is presented in this monograph.

The first part—that written by Mr. Peter A. Stone—was done directly under committee auspices. It pays particular attention to the factors that cause monthly carrying costs of a house to be high, relating these not only to original costs but to financial and service charges and interest rates.

The second part—that by Mr. R. Harold Denton of the Department of Commerce—analyzes the factors which make the capital outlays of housing high, relating them to low productivity. Both studies emphasize the need for technical housing research, standardization of materials, simplification of building codes, and enforcement of antitrust legislation.

In the preparation of this monograph a particular debt of gratitude is due to numerous experts in government and industry who gave it the benefit of their experience and knowledge. In addition to special assistance on occasions too numerous to mention from officials in all departments of government and from manufacturers and builders, these studies have been critically reviewed by Mr. Corwin D. Edwards, Economic Consultant, Antitrust Division, Department of Justice; Mr. Thomas C. Blaisdell, Assistant Director, National Resources Planning Board; Mr. Miles L. Colean, formerly Assistant Administrator, Federal Housing Administration, and presently Research Director, Housing Survey, Twentieth Century Fund; Mr. Morris Miller, assistant general counsel, United States Housing Authority; Mr. Thomas S. Holden, vice president, F. W. Dodge Corporation; and Mr. Joseph B. Mason, eastern editor, American Builder. Their numerous suggestions have been of inestimable benefit. Special acknowledgment is likewise due to Miss Marguerite Milnor, editorial assistant on the staff of the Temporary National Economic Committee, and Mrs. Hannah Esibill upon whom fell the major burden of preparing the manuscript for publication.

Respectfully submitted.

THEODORE J. KREPS,
Economic Adviser.

SEPTEMBER 10, 1940.

SUMMARY AND CONCLUSIONS

There are four principal divisions of the construction industry, which had the following relative dollar volume in 1930:

	<i>Percent</i>
Private nonresidential building.....	16. 8
Private residential building.....	20. 4
Private utilities construction.....	29. 2
Public construction.....	33. 6
Total.....	100. 0

About three-eighths of the total volume was private building, and the remainder was utilities and public construction. During the years 1925 to 1938 the total ranged from about 3 to nearly 12 billion dollars a year. At present the volume is halfway between the high and the low point, or about \$7,000,000,000 annually.

Public construction, as a result of Federal grants, is the only division of the industry which has recently maintained an annual expenditure equal to that of the 1920's. Annual expenditures of the other divisions of the industry range from one-fourth to one-half of their former levels. Hence the construction industry affords the largest single unexploited outlet for investment funds—outlets for which are so necessary to maintain a proper balance in our economic system.

Although nearly all sections of this industry could use investment funds to advantage, the greatest need lies in the field of residential construction. There is a need particularly for the rehousing of 4,000,000 families which cannot be profitably housed in new construction at present costs but must depend upon the use of second-hand houses when they have become depreciated to the point where they fall into the category of slums. These families are in the income group earning less than \$1,000 a year. Many families in the group above this category—those earning from \$1,000 to \$1,500 a year, of which there are over 5,000,000 in nonfarm areas—also require new houses which are not now being constructed, and these families must also depend upon depreciated houses built for the upper-income group, although there is an annual need for at least 350,000 to 400,000 more units than are now being built in the price class below \$4,000.

In order to prevent a recurrence of conditions which cause so large a proportion of the urban population to live in undesirable quarters, it is necessary that new construction be in groups of houses in controlled and properly planned neighborhoods to obtain the largest possible recreational spaces and other amenities which our techniques now provide. Ideally, the most desirable method of providing balanced residential construction is through private enterprise. But the present set-up of the industry is geared to build houses primarily for the income group earning \$2,000 or more per year. We build largely for this limited group because the home-building industry has followed traditional practices and failed to keep up with the progressive

methods that have enabled other industries to extend their markets to low-income groups. The provision of homes today is largely dependent upon a haphazard grouping of small, independent units lacking capital, and upon traditions, customs, and restraints of one kind or another that are difficult to break. Moreover, many of the raw materials of the industry are concentrated in a few hands with a controlled and inflexible pricing system.

The major elements that go to make up the costs of a finished home are land, labor, materials, and financing, to which must be added taxes and operating costs. Each of these involves complicated questions which must be answered before the whole problem of supplying low-cost housing can be solved. Nor can all of the problems involved be solved by Federal legislation. As much can be done locally to remove restrictions and encourage progress in building as can be done nationally.¹ Improvements in the factors involving local police power—such as proper building and zoning ordinances and their intelligent administration—may be as effective in aiding progress in building construction as national laws affecting mortgages. Restraints practiced with the connivance of local officials may easily offset Federal antitrust laws. Lack of planning of city facilities can create new slums faster than Federal subsidies can demolish them.

Another important area for non-Federal attention is the widespread divergence of State laws applying to mortgages. In those States which require heavy foreclosure fees and long repossession periods the margin of equity must of necessity be greater than in States where foreclosure costs are low. While Federal agencies have advised and proposed uniform title, lien, and foreclosure laws; the decision to adopt them rests with the States.

HOUSING FINANCE

The most serious restraints in the field of housing finance either have been eliminated or the machinery has been set up for their elimination. Through the Federal Housing Administration the risks in lending, at least on single-family houses, have been reduced almost to insignificance. There has been a reduction in effective interest rates accordingly. Whether these interest rates can be lowered still further depends upon competition with other forms of investment. The return on F. H. A.-insured loans compares favorably with any other form of investment offering similar security.

A great deal has been accomplished in making financing easy for those who can afford to own homes valued at from \$4,000 to \$6,000, or with incomes of from \$2,000 to \$3,000. Further, a start has been made toward making more money available for homes costing about \$2,500, which, because of land prices and tax problems, the industry can produce only in outlying districts away from the centers of population.

There is one field, however, in which little progress has been made; that is low-rental housing by private industry. While idle funds are abundant, it is still difficult to find private investors willing to assume a portion of the risk in providing equity funds. The F. H. A. insures 75- to 80-percent loans on rental housing on a mortgage carrying a 4

¹ Thomas S. Holden, vice president, F. W. Dodge Corporation, comments that much more can be done locally to remove restrictions and induce progress in building than can be done nationally.

percent interest rate plus 0.5 percent insurance. Apparently there is no difficulty in obtaining loans at these terms wherever commitments to insure are made by the F. H. A.

The F. H. A. could increase the amount of low-rent housing in much the same way that the volume of loans for individual homes was increased, namely, by increasing the mortgage ratio to 90 or even 95 percent of the total property value and reducing interest rates. A 90-percent loan may be just as safe from an insurance point of view as a 75-percent loan carrying a higher interest rate, provided the interest rate is decreased proportionately. The safety of the loan is measured by the ability of the borrower to meet the periodic payments; and the size of the periodic payment rather than the ratio of loan to value determines the ability of the borrower to meet his obligation. The amount of the periodic payment depends not only upon the size of the loan but upon the rate of interest and the period of amortization. For instance, on a project costing \$1,000,000 with a 75-percent loan and an interest rate of $4\frac{1}{2}$ percent, plus 0.5 percent insurance, and starting with a 2-percent amortization, \$52,500 is required to meet the initial annual payment. If the loan ratio is raised to 90 percent and the interest rate is reduced to 3 percent, the amortization and insurance remaining the same, the first annual payment amounts to \$49,500. Certainly this latter obligation is a safer risk than the former. The theory of mortgage lending is that the security of the loan depends upon the margin between loan and value, because recovery must be had through foreclosure; but for safety mortgage insurance depends on the ability of the borrower to meet the periodic payment.

Any question as to whether lenders would be willing to accept lower interest rates may be discounted, considering the present-day money market and the lack of risk involved. It has been pointed out in testimony before the Temporary National Economic Committee that the risk experience of portfolios containing less than 20 percent of F. H. A. insured mortgages is about 0.5 percent;² and since the loss experience of the F. H. A. is but a small fraction of even this low percentage, it would seem that such insured mortgages would be highly desirable where safety is an important factor.

The public interest demands certain returns for the use of public credit for insurance of mortgage investments. The National Housing Act provides these returns by setting a limitation of \$1,350 per room on the mortgage on rental housing, and regulations of the F. H. A. require a dividend limit of 6 percent on the equity (with an additional 2 percent after reserves). For mortgages on individual homes the interest rate is limited to $4\frac{1}{2}$ percent. There would be no reason for a limitation on the equity earnings on rental housing if rents were limited. The public interest would be met if there were merely a rent limitation combined with minimum physical standards of construction and maintenance. The act should be amended accordingly, so that reward to the ingenuity which can achieve the low-rent goal will not be restricted.

Rental housing for the lower half of the middle-income group (\$1,000–\$2,000) might well be stimulated by further amending the National Housing Act so that lower interest rates would be required

² See ch. VI below.

and loans on a higher proportion of the valuation guaranteed in return for lower rentals. Moreover, the rentals should be scaled on the basis of the loan-to-value ratio and the rate of interest.

In short, the principle involved here is that there should be no restrictions on the return to that part of the capital which is risked; but the return on the capital insured against loss should be limited so that public benefit may be derived, and should vary with the limitations imposed.

COLLUSIVE PRACTICES

In building activities proper, a number of types of control are apparent. For those affecting the price of materials there is already sufficient authority under the antitrust laws to take whatever action seems necessary. However, there has been a growing practice on the part of organized subcontractors to combine with labor to maintain local prices of materials and installation work. Some subcontractors, through their so-called codes of fair practice, have maintained both uneconomic practices and high costs. There is a question whether certain State "fair trade practice acts" have not been conducive to this type of restraint, and a reexamination of all State fair trade practice acts might reveal an extensive influence in maintaining high costs.

The Department of Justice has proceeded under the antitrust laws against a number of organized bid depositories and has obtained consent decrees involving the dissolution of these bodies.³ The Department believes that by a widespread attack through indictments it can dissolve all such bid depositories. In cases involving projects aided by Federal funds, such as the Pittsburgh housing projects and some P. W. A. projects, the proceedings are in the form of an indictment under title 18, sections 80 and 88, of the Criminal Code, for conspiracy to defraud the United States.

It has also been found that organized labor has in some instances prevented the adoption of new and more economic methods adaptable to certain items of construction. Because of the set-up of labor by trades, with each trade attempting to get as much work as possible for itself regardless of workers in other trades, the jurisdictional strike has been influential in preventing the adoption of new methods. Whether jurisdictional strikes can be prevented by law is being tested by the Department of Justice, which is appealing an adverse decision in the first of such cases tried.⁴ There is also the problem of subcontractors who are loath to see the introduction of new methods which would eliminate their type of work. Groups of these subcontractors may be influential in preventing the adoption of new methods. Of course, if the Department of Justice is successful in finding that the antitrust laws are adaptable for use in the prevention of such collusive action, there remains only more vigorous prosecution of the laws to obtain the desired results.

On the whole, however, the restraints that can be reached by present antitrust laws probably do not influence costs to the extent that is commonly believed by the public. Perhaps the broadening of

³ For example, in the case of the Excavators Administrative Association, Inc., et al., Washington, D. C., decree of December 22, 1939.

⁴ The case of the Washington local (No. 839) of the International Brotherhood of Teamsters, Chaffeurs, Stablemen and Helpers of America, et al. (decision of May 6, 1940). See Appendix D for list of pending cases involved in the antitrust building investigation of the Department of Justice.

such laws so as to reach local activities which cannot now be reached because of lack of intrastate jurisdiction may be sufficient, together with the present activities of the Department of Justice in seeking a wider interpretation of the antitrust laws, to remove many restraints due to collusion.

RESEARCH

However effective other restraints may have been, one of the reasons for failure to make greater progress in the technique of construction has been the lack of experimentation and research. This is a field in which the desirability of aid by the Federal Government is not questioned. There are several thousand cities and towns in the United States which have local building laws and codes, most of which are based on traditional practices rather than on scientific development, and many of which are designed to protect specific groups. Since building codes are necessary for the protection of the public from hazards of fire, improper sanitary measures, and overcrowding, it is undoubtedly essential that there be legal limitations imposed upon construction. The essential fact, however, is that many of these legal limitations and restraints add to cost without having a basis in scientific knowledge. Certainly the Federal Government might well spend at least as much for housing research as it does for aeronautical research.

Recently there has been set up in the Department of Commerce a section devoted to housing research. This section is reviewing housing standards and, in cooperation with the Bureau of Standards, is determining which of the present standards are excessive, exploring all possibilities for the use of new and better materials for housing at lower cost, and devising new and better construction techniques. This research should in time provide a return many times greater than its cost to the nation as a whole. The fact that the Federal Government has either constructed or supervised the construction of approximately 100,000 dwelling units since 1933, and is committed to the financing of 100,000 more dwelling units, is in itself sufficient justification for the appropriation of a substantial sum for research in finding methods of lowering costs.

PUBLIC HOUSING

With the passage of the act setting up the United States Housing Authority the Federal Government assumed the responsibility of providing decent sanitary housing for those income groups for which private industry does not provide. Unfortunately, however, local governmental bodies (with the exception of New York City and the State of New York) have not assumed any such responsibility except to the limited extent of granting tax exemption and providing 10 percent of the capital funds. Since the Federal Government has assumed this responsibility, it is important to determine whether the aid provided is resulting in the greatest possible accomplishment.

The United States Housing Act provides for (a) the advancing of funds to local housing authorities to a maximum of 90 percent of the total development cost, to be repaid with interest at not less than the going Federal long-term rate plus one-half of 1 percent; and (b) annual Federal and local governmental contributions equal to the difference between the economic rent and the social rent, with the

Federal subsidy pledged to apply to payment of the financing charge, the latter being approximately one-third of the economic rent.⁵

The total Federal contributions so far authorized amount to \$28,000,000 per year, which, with local contributions, provides for approximately 160,000 families. Under present conditions, however, the actual cost to the Government, when the full amount of authorized loans has been exhausted, may not be more than about \$14,000,000, instead of \$28,000,000 per year. This will be due to the following factors:

(1) Annual Federal contributions have been lowered, through reduced costs of operating budgets of projects, from the authorized maximum amounting to about 3.5 percent of total development costs to approximately 2.8 percent of such costs.⁶ However, funds may have to be provided to the extent of the maximum amount since the budgets are subject to review after the first 10 years and each 5-year period thereafter, and conditions at those times may require that the full amount of contributions be utilized. But on the basis of present operating budgets this factor alone brings the maximum cost of contributions down to \$22,400,000 per year when the maximum number of houses has been tenanted.

(2) Reduction in cost to the Government is brought about by the fact that the provisions of the act result in a usual interest rate of 3 percent on loans to the local authorities, whereas the cost to the U. S. H. A. is only 1½ percent.⁷ But this difference, which in effect reduces the cost of the annual contribution per dwelling unit and is termed by U. S. H. A. an "interest profit", cannot be utilized unless loans for development of projects are obtained by local authorities from local sources for a greater proportion than the 10 percent required by law. There is nothing in the act that requires local housing authorities to borrow on the U. S. H. A. terms; and to the extent to which they may borrow funds from other sources at a lower rate than that charged by the U. S. H. A., they increase the number of units that can be built.

Within these limitations the U. S. H. A. must choose between two possibilities: it can grant the maximum annual contribution and reach the lowest-income group possible; or it can reduce the annual contribution per unit and spread the total funds over a larger number of families of a little higher income group. Having funds for only about 160,000 units if the maximum contribution is allowed, and a tenant pool of between 4 and 5 million families who could qualify as slum dwellers, the U. S. H. A. has attempted to provide some housing for nearly all groups within the lowest third income group (under \$1,000), except the very lowest income class.

The possibilities of increasing the number of families rehoused under the present authorization are through (a) lowering the total development cost—this reduces the economic rent and hence reduces the difference between social and economic rent, which the Federal and local contributions represent; (b) reducing the interest factor in the economic rent by using a greater proportion of local funds, assuming that they can be obtained at a lower rate than that charged by the

⁵ See ch. IX below.

⁶ What Does the Housing Program Cost? a brochure published by the U. S. Housing Authority, March 1940.

⁷ See testimony of Nathan Straus, Administrator, U. S. Housing Authority, in Hearings before the Temporary National Economic Committee, pt. 11, pp. 5413, 5420, 5421.

U. S. H. A.; and (c) providing less than the maximum contribution, which usually means failing to reach the lowest possible income group. Actually the U. S. H. A. is experimenting with all three of these possibilities and, as a result, may provide as many as 170,000 dwelling units instead of the 160,000 originally estimated. If an increased authorization for contributions were provided and the U. S. H. A. were permitted to charge an interest rate as low as that which it pays, the number of families rehoused with the \$800,000,000 of loans already authorized would be increased still further.

Throughout this monograph no attempt has been made to evaluate the social benefits to be derived from rehousing a substantial portion of the population, or to estimate the social costs of allowing a large portion of our housing plant to disintegrate and permitting millions of slum dwellings to exist. The attempt has been confined to a study of the economic behavior of the housing industry and the part that it might take in revitalizing the entire economy. In substance we have found that, with the correction of certain features of the private housing industry and its financing, and some modifications in the provisions for public aid to housing, increased activities in both fields would provide an economic gain; and any social benefits will be clear profit.

CHAPTER I

CONSTRUCTION AND THE GENERAL ECONOMY

The scope of the construction industry is so vast and of such far-reaching significance that its exact inclusions have not been clearly defined. Although in the minds of most people there is a general understanding of what is included in the term "construction," there are differences as to the meanings which appear in statistical measurements. It may be well, therefore, at the beginning of this report, to give some definitions of our subject.

The definition provided by the United States Department of Commerce is as follows: "Construction activity is considered here to include the design, production, and maintenance of fixed works and structures."¹ While this definition clearly encompasses the construction activity, it is perhaps a little wider than the general concept of the industry. For instance, the term "maintenance of fixed works and structures" may be interpreted to include activities which are clearly beyond the construction industry as such. In certain types of fixed structures, it is commonly understood that maintenance may include such things as janitor service, operation of heating plant, street cleaning and sprinkling, and other minor items which are continuous operations rather than a part of the activities requiring new capital expenditures. It is also true that some maintenance activities, such as painting, which must be repeated periodically, employ the same materials as those used in the construction of new fixed works.

On the other hand, the statistics published by the Department of Commerce include separate figures for new construction; they exclude equipment costs in public utilities; work-relief figures are shown separately. The two items last mentioned are included in estimates of volume published by the Works Progress Administration (now Work Projects Administration of the Federal Works Agency).² It has been suggested by some students of the problem that the drilling of oil wells and sinking of mine shafts might also be included in construction, yet both estimates of volume mentioned above omit such items. The problem is further complicated by the fact that the Bureau of the Census, in compiling business statistics, includes only that part of construction done by contractors, all other construction work being included in the particular industry for which the work is done.

It is difficult to draw the line precisely; consequently it must be borne in mind that figures quoted herein may differ, due to the varying definitions used in different estimates. On the whole, however, these differences are not of sufficient magnitude to influence any conclusions derived from them. With these differences in mind we

¹ Bureau of Foreign and Domestic Commerce, *Construction Activity in the United States, 1915-37* Washington, 1938, p. 3.

² *Construction Expenditures and Employment, 1925-36, and Construction Expenditures and Employment, 1936-38*, Works Progress Administration, Washington, June 1, 1937, April 1939.

may consider that the construction industry includes the design, production and alteration of fixed works and structures. For the most part the specific figures which have been taken as measurements of the industry have been compiled with a view to eliminating, as far as possible, items about which there may be some doubt as to their applicability to the durable goods industries.

On the above basis, then, this report will attempt to survey the important factors in the construction industry, placing particular emphasis on that section of the industry which we will call "housing." It will attempt to probe, as far as possible, the essential data that will throw some light on the problems affecting this industry and the manner in which this industry affects our economy.

VOLUME AND EMPLOYMENT

The construction industry itself shows a volume of activity ranging from nearly \$12,000,000,000 a year during the peak of the last cycle to about \$3,000,000,000 at the low point of the depression, as shown by chart I.³ At the peak of employment, in the month of August 1928, approximately 2,400,000 workers were employed, while in the peak month (seasonally) of 1933, only 1,000,000 were employed—a drop of 58 percent.⁴

In 1929 the industry accounted for approximately 5½ percent of the total nonagricultural labor forces of the United States.⁵ This figure does not include the large number of workers in industries supplying products to the construction industry. The latter has been variously estimated from a number equal to 1½ times those directly employed in construction to a much larger figure. We may safely say that construction activity at its peak of the last cycle was responsible for the employment of between 4 and 5 million nonagricultural workers.

Chart I (giving the value of construction) shows that there are three principal divisions of the industry which had varying lines of fluctuation—residential, private nonresidential, and public. Of great importance is the fact, shown in the chart, that the most violent fluctuation as between the peak and the low point occurs in residential and private nonresidential rather than in the public construction section of the industry.

Let us now shift the classification slightly and divide the industry into private building excluding utilities, on the one hand, and all public construction and private utilities, on the other. Employment figures compiled for the Works Progress Administration show that private building (excluding utilities) reached a low point of only 116,000 persons directly employed in January and February of 1933 (or an average of 201,000 for the year), as compared with a high of 1,654,000 in November of 1925, and that even in the recovery the highest point reached was 768,000 in October 1936.⁶ Public construction and utilities, on the other hand, showed employment of approximately 1,100,000 at the peak month, as compared with an average of 800,000 during 1932, after which there was a considerable increase due to the activities of Federal, State, and local governments

³ From exhibit No. 837, Hearings before the Temporary National Economic Committee, pt. 11, Construction Industry, p. 4944.

⁴ Isador Lubin, Testimony, Hearings before the Temporary National Economic Committee, pt. 11, pp. 4938 and 5461.

⁵ *Ibid.*, p. 4942.

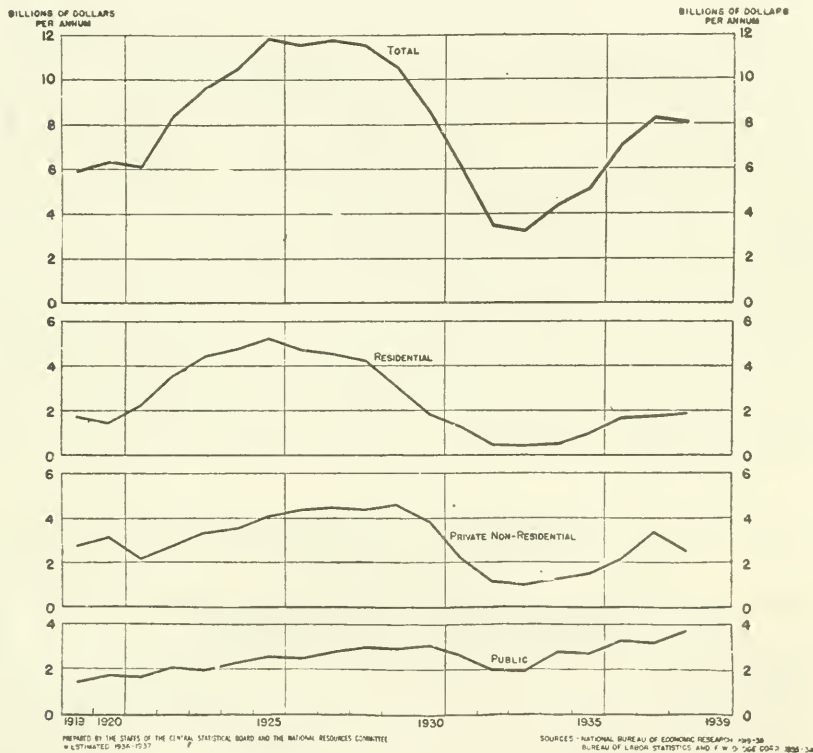
⁶ Construction Expenditures and Employment, 1925-36, table V, p. 43, and Construction Expenditures and Employment, 1936-38, table VII, p. 13, Works Progress Administration, June 1, 1937, April 1939

in providing work relief. The exact measurement of recovery in this field is complicated by the extent to which public works have been constructed as relief programs.

Thus, it is the private building industry that has been the principal sufferer from the depression. It is for this reason that all eyes have turned hopefully toward the building industry for recovery.

CHART I

VALUE OF ALL CONSTRUCTION



RELATION TO OTHER INDUSTRIES

It is not only the direct expenditures and employment of the construction industry that have fluctuated so violently, but a large part of the manufacturing industry is also involved in the volume of construction activity. For instance, total expenditures on projects of the Public Works Administration from July 1933 to March 1939 involved in placing of material orders, including 99 principal items, having a value of \$2,205,601,611.⁷ These include such varying items as mattresses and bed springs, tents and awnings, machine tools, explosives, carpets and rugs, as well as cement, brick, and lumber.

The principal industries affected are lumber, brick and clay products, cement, structural and ornamental metal, heating apparatus, and plumbers' supplies. Pay rolls of practically all of these dropped from

⁷ Bureau of Labor Statistics, Value of Material Orders Placed for Projects Financed by Public Works Administration Funds, from July 1, 1933, to March 15, 1939 (subject to revision).

CHART II

MANUFACTURING EMPLOYMENT
DURABLE & NONDURABLE GOODS GROUP
 1923 ~ 25 = 100

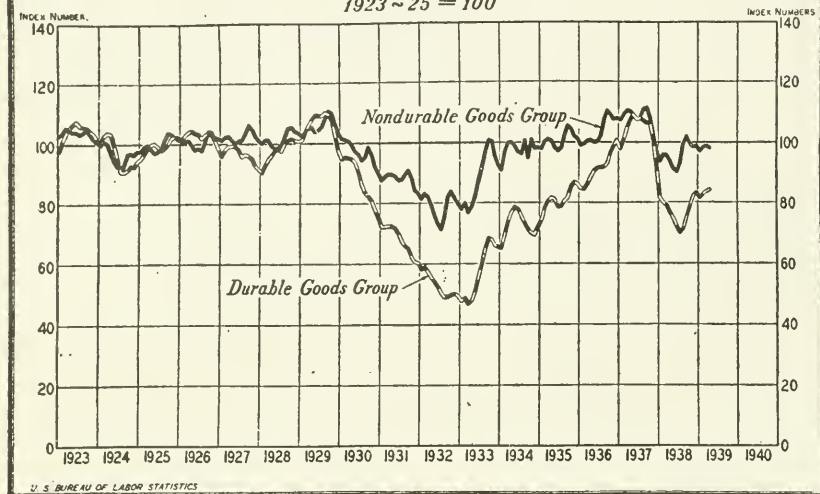


CHART III

EMPLOYMENT AND PAY ROLLS
STEAM & HOT-WATER HEATING APPARATUS & STEAM FITTINGS

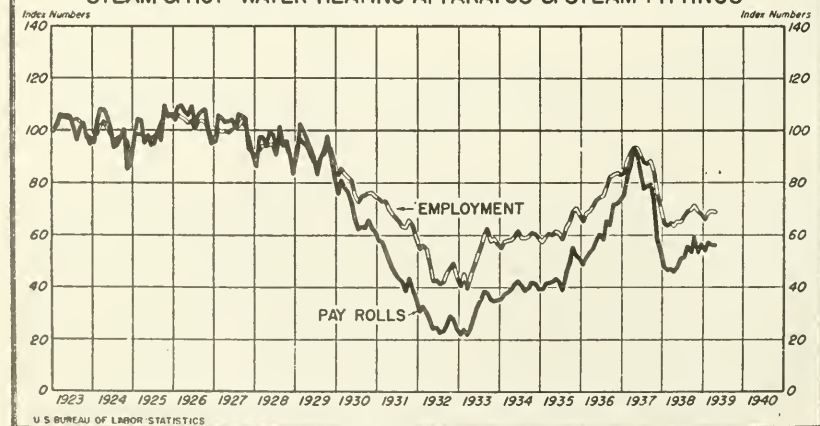


CHART IV



CHART V

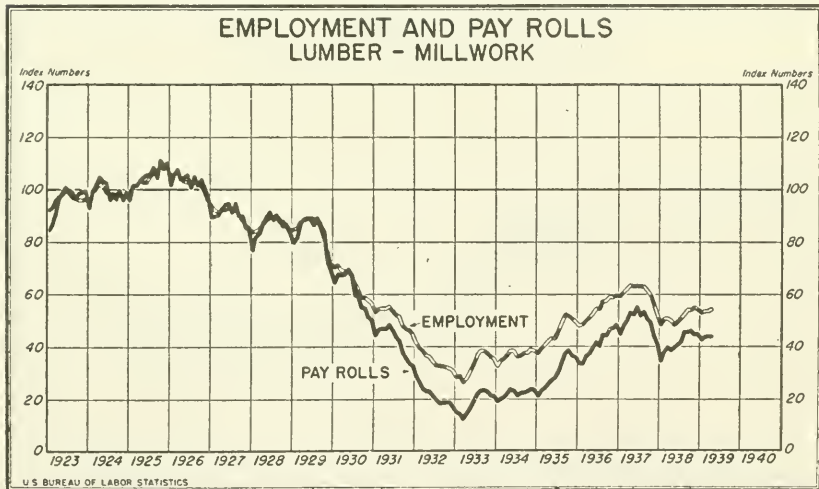


CHART VI

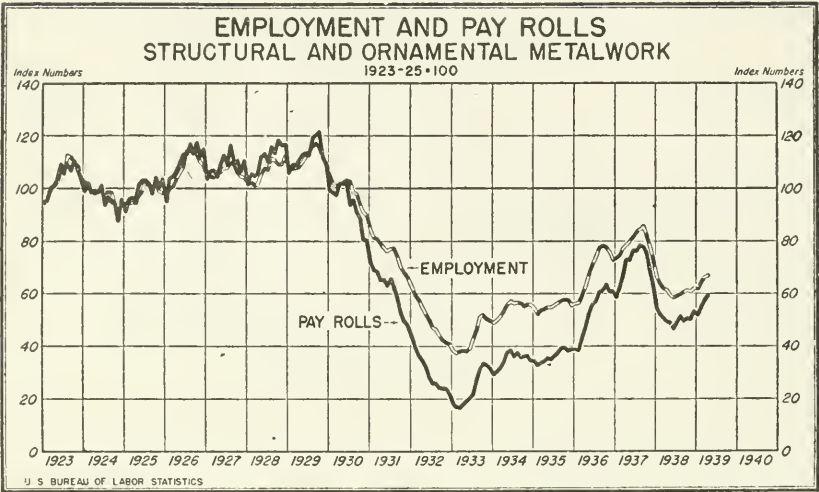


CHART VII



CHART VIII

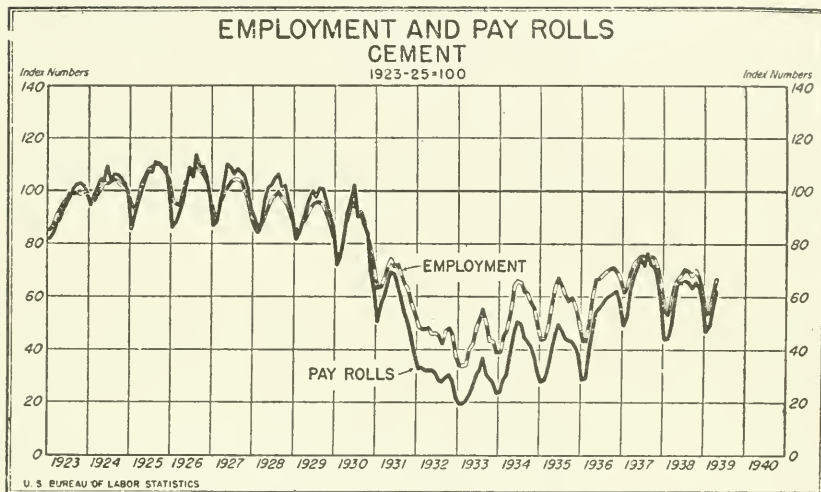


CHART IX



an index of approximately 110 (1923-25 average equals 100) during the height of activity in the last cycle to a low point of around 20 or less during 1933, as shown by charts II to IX.⁸ In terms of employment, the drop was from about the same peak to around 30 to 40. The effect on all durable-goods manufacture is also shown in chart II. The index of employment for durable goods dropped from 110 in 1929 (1923-25 equals 100) to 50 in 1932, while the index for nondurable goods dropped from 110 to about 75 during the same period.

The above shows only the effect on manufacturing. Transportation is likewise affected. It has been estimated that 19.5 percent of all revenue freight originating in 1929 was classified as construction materials; approximately one out of every five cars carried raw or finished construction materials. Approximately 11 percent of railroad employment and 12 percent of pay rolls could be attributed to construction in 1929.⁹

In addition to the industry itself and that part of manufacturing and transportation concerned with construction materials, there is the effect upon the production of consumer goods and services. While there have been some attempts to measure the indirect effects of construction activity, such attempts have been too limited to warrant a conclusion capable of expression in terms of statistical measurement. Nevertheless, it is obvious that the difference between 1½ million¹⁰ and 4 million persons engaged in a given activity must have serious repercussions on the whole economic scene.

INVESTMENT OUTLETS

The cost of a structure or fixed works varies with the type, ranging from single-family residential buildings with an average cost of \$4,000 up to many millions of dollars for large hydroelectric power plants. During the N. R. A., the lower limit coming within the purview of the Construction Industry Code was \$2,000. The F. W. Dodge Corporation, which compiles commercial construction statistics, includes \$2,000 projects as its minimum. Thus it may be seen that the construction industry produces a commodity with a high minimum value, the funds for which must come from accumulations of savings or credit.

Without going into an extended discussion of the functioning of the economic system, we may point out here that if the nation's savings are to result in employment and purchasing power they must find investment outlets. Testimony before the Temporary National Economic Committee has indicated that in 1936 and 1937 capital outlays made in industrial plant and equipment were on a scale quite comparable with those of 1927-29.¹¹ Railroads and utilities, however, have lagged considerably, failing to play their full part in recovery. Special conditions surround railroads and the entire

⁸ From exhibits Nos. 829-836, Hearings before the Temporary National Economic Committee, Part 11, pp. 4935-4942.

⁹ Lawrence Mehren, *Employment and Values in Construction*, Engineering News-Record, September 21, 1933, vol. 3, tables IV, V, pp. 355; 356.

¹⁰ This figure includes an estimated half million workers supplying products to the construction industry. It is based on the conservative estimate of 1,600,000 such workers which is included in the above estimate of 4,000,000 workers for whom construction activity at the 1928 peak of employment was responsible.

¹¹ A. H. Hansen, Hearings before the Temporary National Economic Committee, Part 9, Savings and Investment, p. 3514.

transportation field, pointing to the possibility that little can be expected in this field in the immediate future, at least. As for utilities, there is a possibility that a considerable volume of investment expenditures will develop. This factor will be explored more fully in a later chapter.

The point to be emphasized here is that for a proper functioning of the economy it is necessary that construction be expanded, not only to the high point reached in the past, but to a point which will maintain an expanding economy and an increasing population with a continuously expanding standard of living. For these reasons, because unemployment persists and a remedy is urgently needed, it is important to analyze the construction industry and its problems to find, if possible, the deterrants to expansion, and to consider remedies which may suggest themselves as a result of such analysis.

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CHAPTER II

TRENDS IN NONRESIDENTIAL AND PUBLIC CONSTRUCTION

The most common division of the construction industry is between building, whether private or public, and engineering works. The reasons for this are apparent. The building industry requires a greater amount of specialization, with its corollaries of a large amcu.. of skilled labor and generally higher wages; its location is principally in cities; and, except for public buildings and recent aid through public agencies, it is financed from private funds. Engineering works, on the other hand, require a greater proportion of unskilled labor and, except for private utilities, are financed from public funds.

PRIVATE NONRESIDENTIAL BUILDING

Private nonresidential building is of varying types, each of which is influenced by different factors. The most important of these types are commercial and industrial buildings. Other types include churches, theaters, lodges, etc., all of which react to general business conditions.

The total volume of nonresidential building over a period of years is shown in table I. It may be noted from this table that for the period covered commercial buildings represent the largest group of nonresidential buildings. Commercial building during the 1920's averaged around \$900,000,000 a year, reached a low point of \$118,000,000 in 1933, and recovered to \$336,000,000 in 1937.

TABLE I.—*Estimated volume of private nonresidential building, 1925-38*

[Millions of dollars]

Year	Total	Commer- cial	Industrial	Other
1925	1,934	793	329	812
1926	2,340	959	491	890
1927	2,191	920	438	833
1928	2,222	911	489	822
1929	2,304	945	599	760
1930	1,358	611	299	448
1931	732	315	124	293
1932	279	137	47	95
1933	309	118	111	80
1934	392	153	149	90
1935	430	189	138	103
1936	639	275	224	140
1937	840	336	337	167
1938	612	257	226	129

Source: Data utilized in Construction Expenditures and Employment, 1925-36, p. 39, and Construction Expenditures and Employment, 1936-38, p. 10, Works Progress Administration, Washington, June 1, 1937, April 1939.

Of great importance is the changing composition of the commercial buildings group. Table II shows the composition of this group for 4 periods: 1929, 1933, 1937, and 1939. During the first

period, which was representative of the 1920's, office buildings comprised nearly 47 percent of the total commercial, dropping to less than 12 percent in 1933; in early 1939 this group represented 21.8 percent. Existing vacancies in office buildings determine to a great extent needed construction and are a factor in all commercial building needs. However, the figures shown in table II indicate that store building (including restaurants) is the most important factor, recently constituting more than one-half the total commercial. This rise in the ratio of store buildings, which in 1937 represented 64 percent of their 1929 total, as compared with office buildings, which amounted to only 12 percent of their 1929 total, indicates that store building is becoming more closely related to residential building, due to the fact that the growth in residential areas has been away from the large city center and has called for more suburban shopping centers.

Vacancies in office buildings, however, are still the determining factor in new construction of this type, and figures reported in 1938 by the National Association of Building Owners and Managers indicate that existing vacancies were not being absorbed at a rate comparable with business improvement. The high point in vacancies occurred in 1934 with 28 percent, compared with an average of 10 percent during the latter 1920's. In the first part of 1938 they were still 18 percent.¹

TABLE II.—*Volume of commercial building—37 Eastern States*

[Thousands of dollars]

Year	Bank build- ings	Garages and service stations	Offices and loft buildings	Stores and and res- taurants	Ware- houses	Total
1928:						
Value	35, 188. 90	157, 776. 70	435, 288. 50	211, 130. 60	89, 803. 70	929, 188. 40
Percent of total	3. 79	16. 98	46. 85	22. 72	9. 66	100. 00
1933:						
Value	3, 419. 70	16, 428. 90	11, 683. 60	46, 943. 80	20, 895. 20	99, 371. 20
Percent of total	3. 44	16. 53	11. 75	47. 24	21. 04	100. 00
1937:						
Value	7, 364. 20	47, 910. 60	52, 811. 90	135, 076. 80	53, 879. 90	297, 043. 40
Percent of total	2. 48	16. 13	17. 78	45. 47	18. 14	100. 00
1939 (first 6 months):						
Value	2, 755. 00	19, 490. 00	25, 257. 00	59, 388. 00	8, 907. 00	115, 797. 00
Percent of total	2. 38	16. 83	21. 81	51. 29	7. 69	100. 00

Source: F. W. Dodge Corporation, New York.

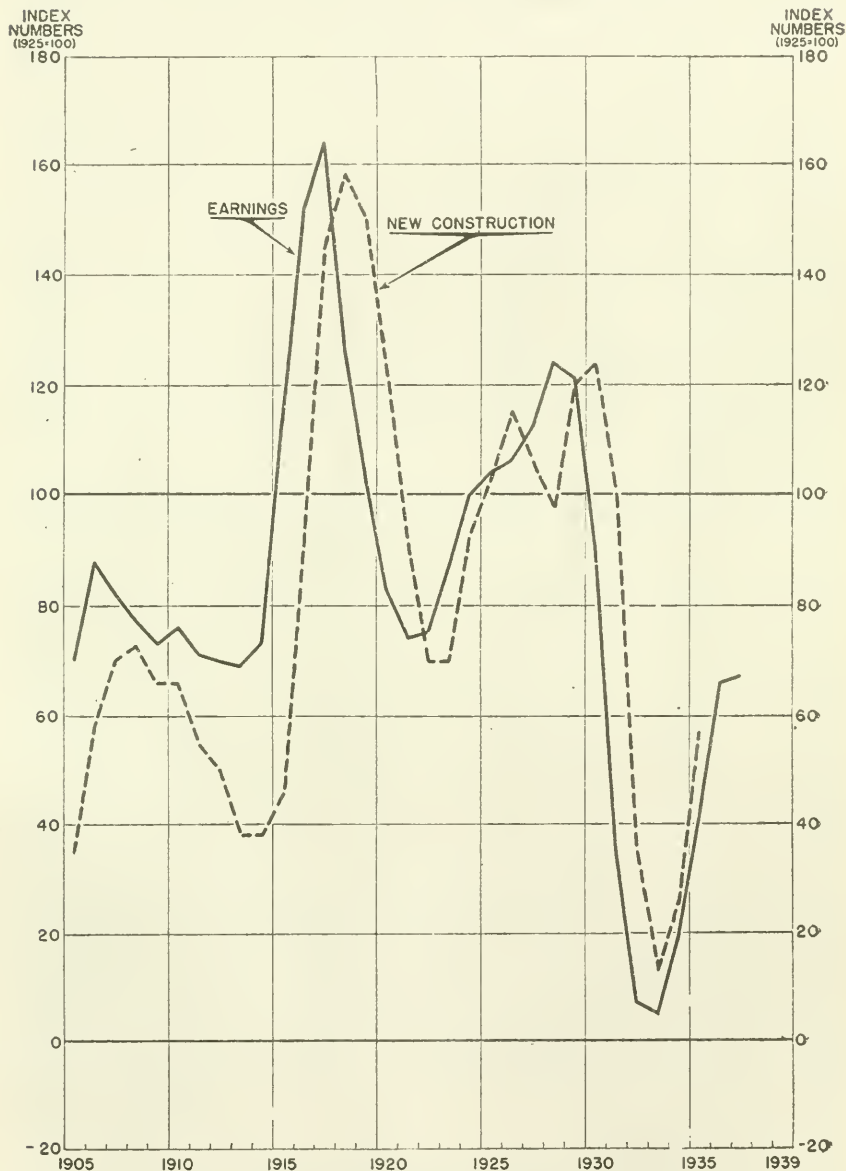
Industrial building appears to be influenced more by industrial earnings than by any other factor. This is illustrated in chart X, which shows the earnings before depreciation compared with new construction expenditures of the United States Steel Corporation covering a period of 33 years (1904-38). Apparently, so far as the United States Steel Corporation is concerned at least, investment in new construction follows by about one year the net earnings, and is not the result of either anticipated earnings or production, although it seems logical to assume that the anticipation of continued earnings would be an important factor in any decision to invest new funds. Approximately the same results are shown in comparing total industrial earnings with total industrial construction.²

¹ Real Estate Analyst, St. Louis, July 27, 1938, vol. 7, p. 1006.² Lowell J. Chawncr, *Basic Factors in the Trend of Construction*, Construction Costs, 1937 edition, published by Engineering News-Record pp. 10, 11.

CHART X

UNITED STATES STEEL CORPORATION
EARNINGS AND NEW CONSTRUCTION

3 YEAR MOVING AVERAGE, 1904-1938



PRIVATE UTILITIES CONSTRUCTION

Privately owned utilities include railroads, telephone and telegraph systems, gas plants, and the electric power and light industry. Although the last-mentioned segment has normally constituted from one-third to nearly one-half the total volume properly included under utilities, other items such as railroads and electric railways have shown about as great a decline in new construction as have electric power and light plants.

Table III shows the various categories of privately owned utilities and the estimated volume of expenditures from 1925 to 1938, inclusive. According to this table, railroad construction averaged \$484,000,000 million a year for the years 1925-30, and only \$157,000,000 a year for the years 1936-38. Little, if any, improvement can be expected in the near future—certainly not for new-line extensions. Possible improvements such as double tracking and electrification may increase this rate somewhat in more prosperous times, but with more miles of road being abandoned each year, plus the increased volume of truck hauling there seems to be little hope that railroad expenditures for new improvements can ever be stepped up much beyond the present rate. There is even a likelihood of reduction in this rate, which includes a considerable amount for the railroads' share of the cost of grade-crossing elimination. As the amount of public appropriation for this activity is reduced, the railroads' expenditure will be reduced proportionately.

Electric railway construction, although averaging in 1936-38, 57 percent of the 1925-30 annual average, shows little possibility of recovery to its former levels. That buses are replacing electric railways for city and suburban transportation is generally well known. The extent to which this has taken place is shown by the fact that the mileage of surface railway rapid transit, and suburban railroad track in the United States was reduced from 44,985 miles in 1923 to 30,612 in 1936.³ On the other hand, the number of cities where busses (including trolley busses) provide all local transit service rose from only two cities of more than 25,000 population in 1923 to 125 such cities in 1936.⁴ New subway construction now being proposed, including that for Chicago already under way, might indicate an increase in this category; however, such construction is for the most part under municipal ownership and not under privately owned utilities.

Construction of power and light plants, commonly considered the major portion of privately owned utilities, had an average volume of \$751,000,000 for the years 1925-30, and dropped to an average of \$330,000,000 for the years 1936-38.⁵ These figures represent construction by privately owned utility companies only. The difference between the 1925-30 and the 1936-38 average volume is \$421,000,000. Only a small part of this decline has been made up by public expenditures for power and light facilities. Such expenditures averaged \$72,000,000 per year for the 1925-30 period as compared with about

³ Transit Journal, January 1936, vol. 80, No. 1, p. 15. John A. Miller, Motorization Progress shown by Rail and Bus Route Changes.

⁴ Ibid., p. 17.

⁵ These figures exclude land, but include power-plant equipment, estimated by the Department of Commerce to be from 45 to 57 percent of the total cost between 1925 and 1936. See U. S. Department of Commerce, Construction Activity in the United States, 1915-37, table 30, p. 66.

\$109,000,000 for the years 1936-38.⁶ In the meantime the use of electric power has shown a phenomenal growth. From 1926 to 1937 electric power sales increased from slightly more than 56 billion kilowatt-hours to 99.4 billion kilowatt-hours sold—an increase of 77 percent. During the same period generating capacity increased from 23.1 million to nearly 35 million kilowatts—an increase of only 51 percent.⁷ The increased use of electric power has far outrun the increase in generating facilities and apparently offers a possibility of a return to the construction volume of the 1920's.

TABLE III.—*Private utilities construction by types, 1925-38*

[Millions of dollars]

Year	Total	Rail-roads	Electric railroads	Power and light	Telephone and telegraph	Water-works	Pipe lines	Gas plants
1925.....	1,791	396	52	761	341	14	23	204
1926.....	1,864	444	61	704	363	13	42	247
1927.....	2,128	550	77	716	360	13	104	308
1928.....	2,016	427	90	681	412	11	65	330
1929.....	2,349	562	82	800	553	12	108	232
1930.....	2,367	528	85	844	550	20	119	221
1931.....	1,468	242	69	539	373	16	84	145
1932.....	700	108	29	211	241	10	17	84
1933.....	468	112	21	104	164	5	18	44
1934.....	555	141	30	126	178	6	21	53
1935.....	788	278	40	170	192	8	45	55
1936.....	870	145	45	277	257	12	44	90
1937.....	1,217	197	39	429	357	11	87	97
1938.....	873	128	41	285	319	14	40	46

Source: Construction Expenditures and Employment, 1925-36, p. 40, and Construction Expenditures and Employment, 1936-38, p. 10, Works Progress Administration, Washington, June 1, 1937, April 1939.

New construction expenditures for telephone and telegraph show a much smaller decline than any other important type of private utilities construction, and for the 1936-38 period were approximately 75 percent of the 1925-30 period, or \$311,000,000 per year, as compared with an average of \$430,000,000 per year during the 1925-30 period. These figures do not include buildings, which constitute a considerable part of the total construction for this utility. The greater part of such construction is done through the operating companies' own forces and consists of new lines and extensions, placing lines under ground, etc. Since this utility is practically under unified control, its construction is more uniform than that of the other important types of utilities and reacts to general business conditions with less fluctuation. The general growth in the future will undoubtedly be proportionate to the growth in the general volume of business.

Waterworks are (and for years have been) a declining factor in private utilities construction and warrant little consideration in this category. However, they occupy an important place in public construction and will be more fully considered under that heading.

The last two groups under the classification "private utilities," pipe lines and gas plants, may well be combined. Data on gas sales indicate, although there was a drop from 365 b. c. f. (billion cubic feet) in 1929 to 350.6 b. c. f. in 1937 in total sales of gas, there was an increase from 1.3 b. c. f. to 50.4 b. c. f. in sales of natural gas over the

⁶ See Construction Expenditures and Employment, 1925-36, p. 41, and Construction Expenditures and Employment, 1936-1938, p. 10, Works Progress Administration, June 1, 1937, April 1939. The 109 millions include an estimated average of 50 millions of Federal construction (T. V. A., etc.).

⁷ The Electric Light and Power Industry in the United States, 1937 (Statistical Bulletin No. 5), Edison Electric Institute, New York, April 1938, table 1, pp. 2, 3.

same period.⁸ Construction of pipe lines and gas plants shows a volume of only \$135,000,000 average for the years 1936-38, as compared with an annual average of \$334,000,000 for the years 1925-30. Thus, gas was utilized in 1937 at about 96 percent of the 1929 volume, while construction of new facilities has recently been at a rate equal to only about 40 percent of the 1929 rate. This would seem to promise a possibility of recovery.

PUBLIC CONSTRUCTION

Public construction covers facilities constructed by the Federal Government and State and local governments. About one-fourth of the total in the past has been for buildings, and approximately one-half for roads and streets. The balance consists of waterworks, sewers, recreation facilities, river and harbor improvements, flood control, reclamation, power and light plants, and, in more recent years, housing.

The total value of public construction for the years 1925-30 averaged \$2,386,000,000 per year. Of this amount construction by the Federal Government, including grants for Federal-aid highways, averaged \$284,000,000 a year, or about 12 percent. Total public construction for the years 1936-38 amounted to an average of \$3,224,000,000 a year, of which the Federal Government provided \$2,198,000,000 a year, including grants, or about 68 percent. This is derived from table IV, which shows expenditures for public construction for each year from 1925 to 1938. The large amount of grants in the latter years includes construction work done through emergency agencies such as C. W. A., P. W. A., W. P. A., etc. It may be seen in table IV that the total annual volume of public construction for the years 1936-38 not only is equal to the average 1925-30 volume but exceeds it by nearly a billion dollars a year. It may also be noted that average expenditures by State and local bodies during the 1936-38 period amounted to less than one-half the amount spent annually during the years 1925-30. Thus it may be seen that the increase in Federal expenditures for construction amounted to approximately \$2,000,000,000 a year. Included in this \$2,000,000,000 are the following W. P. A. construction expenditures:

	<i>Millions of dollars</i>
1936.....	1,222
1937.....	994
1938.....	1,206

an average of \$1,141,000,000 a year for the 3 years. This represents expenditures primarily for work relief, which, considering the general financial condition of States and cities, would not have been done otherwise. The amounts spent by State and local bodies as sponsors' funds, in conjunction with W. P. A., have been included in the total expenditures by State and local bodies.

⁸ Annual Statistics of the Manufactured Gas Industry in 1937 (Bulletin No. 32), American Gas Association, New York, October 1938. Total gas sales from p. 6; natural gas, from p. 10.

TABLE IV.—*Public construction in the United States, 1925-38*

[Millions of dollars]

Year	Total	State and local construction ¹	Construction from Federal grants	Direct Federal construction
1925	2, 181	1, 936	90	155
1926	2, 137	1, 909	78	150
1927	2, 373	2, 123	80	165
1928	2, 484	2, 206	81	197
1929	2, 415	2, 100	77	238
1930	2, 726	2, 335	96	295
1931	2, 512	1, 997	163	352
1932	1, 878	1, 417	93	368
1933	1, 827	1, 163	324	340
1934	2, 619	1, 021	1, 047	551
1935	2, 579	1, 282	744	553
1936	3, 261	825	1, 834	602
1937	3, 034	1, 012	1, 460	562
1938	3, 376	1, 240	1, 559	577

¹ Includes Federal loans.

Source: Construction Expenditures and Employment, 1925-36, pp. 41, 42, and Construction Expenditures and Employment, 1936-38, p. 12, Works Progress Administration, Washington, June 1, 1937, April 1939.

On the whole, about one-half of the Federal increase represents a transfer of obligation from the States, cities, and counties to the Federal Government, and the increase in total volume represents partly an expansion in expenditures on functions that have normally been considered a Federal obligation, such as flood control, reclamation, defense, etc., and partly an exercise of new functions such as construction of power plants (about \$50,000,000 per year) and providing work relief. However, in amount the latter was sufficient only to make up the deficiency in State and local public construction.⁹

It may well be accepted that the normal Federal needs of public construction, considering the functions already assumed, should average in the neighborhood of \$500,000,000 a year, and that State and local needs represent a normal expenditure of \$2,500,000,000, making a total of \$3,000,000,000 a year for public construction. Whether States and cities can resume the responsibility for that portion of the expenditures for public construction in which they are now deficient depends on such questions as the relative ability to raise funds either from taxation or bond sales as between the Federal and local governments, the additional financial responsibilities of States due to both relief and social security needs, and constitutional limitations on debt. These questions, while germane to the volume of public construction, are not the primary concern of this report. A later chapter will deal with one particular phase, namely, the relation of municipal services and housing.

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⁹ Compare A. H. Hansen, *Hearings before the Temporary National Economic Committee*, Part 9, Savings and Investment, pp. 3517, 3547. Compare also exhibit No. 614 in Part 9, p. 3779, and data in Appendix, p. 4064; however, the basic figures used here are somewhat different from the above and are classified differently.

CHAPTER III

MARKET FACTORS AND NEEDS IN RESIDENTIAL BUILDING

So far we have analyzed three important segments of the construction industry and the factors relating to their expansion. We have seen that in private nonresidential building the important factors are industrial and commercial building; that the latter, for the near future, must depend upon an increase in store building, which follows the residential market to a large extent, and that industrial building is the result of increased industrial earnings. We have seen that in private utilities the greatest hope lies in new electric power and light facilities and gas plants; and that in public construction the total volume has increased above normal during the depression, but that the greatest change has been a transference of financing from State and local bodies to the Federal Government.

We have not discussed residential construction, which is one of the most important categories. Of the total volume of construction, which ranged up to slightly more than \$11,000,000,000 in 1928, and averaged \$10,130,000,000 from 1925 to 1930, inclusive, the volume of residential building was \$4,338,000,000 in 1928, and averaged \$3,600,000,000 for the years 1925 to 1930. This is shown in table V. Residential construction was as high as 42 percent of the total in 1925 and averaged 35.5 percent for the years 1925 to 1930. In the years 1936 to 1938 the average of all construction was \$6,460,000,000, after going as low as \$3,002,000,000 in 1933, while the average of residential building was \$1,552,000,000, or 24 percent of the 1936 to 1938 total. This drop in residential construction from an average of \$3,600,000,000 to \$1,552,000,000 represents the greatest single area of possibilities for increase.

TABLE V.—*Residential construction and total construction in the United States, 1925-38*

Year	Total construction (millions of dollars)	Residential construction (millions of dollars)	Ratio of residential to total construction (percent)
1925.....	10, 159	4, 253	41. 86
1926.....	10, 397	4, 056	39. 01
1927.....	10, 896	4, 204	38. 58
1928.....	11, 060	4, 338	39. 22
1929.....	10, 166	3, 098	30. 47
1930.....	8, 105	1, 654	20. 41
1931.....	5, 934	1, 222	20. 59
1932.....	3, 289	432	13. 13
1933.....	3, 002	398	13. 26
1934.....	3, 082	416	10. 45
1935.....	4, 561	764	16. 75
1936.....	6, 266	1, 496	23. 87
1937.....	6, 623	1, 532	23. 13
1938.....	6, 490	1, 629	25. 10

Source: Construction Expenditures and Employment, 1925-36, pp. 14, 39, and Construction Expenditures and Employment, 1936-38, p. 10, Works Progress Administration, Washington, June 1, 1937, April 1939.

Residential construction is affected by a number of factors. Among them are increases in population, formation of new families, incomes of families, housing replacement, and an increase in the standard of housing.

POPULATION REQUIREMENTS

The relation of population to housing appears in the change in number of nonfarm families each year caused by the migration of farm families to cities, and in the formation of new families brought about by marriages. The net addition to the total number of families has been estimated by the National Resources Committee as averaging 412,000 families per year for the 5-year period beginning in 1930, 479,000 per year for the period beginning in 1935, and 474,000 per year for the period beginning in 1940.¹ By subtracting the increase in farm families from these figures, we arrive at the following: 5-year period beginning in 1930, 288,000 per year (assuming the same increase in farm families from 1935 to 1945 as occurred between 1930 and 1935); period beginning in 1935, 355,000 per year; and period beginning in 1940, 350,000 new nonfarm families per year.

That part of the total increase which may be apportioned to farm families as against nonfarm families depends in a large measure upon the relative conditions of prosperity and employment. Generally speaking, an increased volume of industrial activity brings increased migration from farm to city. According to estimates given in the testimony of Dr. Isador Lubin an average of 280,000 new nonfarm families per year are to be provided for in the next 10 years.² It is probable that this is a minimum estimate.

However, Lowell J. Chawner's estimates (above mentioned) provide an average annual increase of 474,000 per year, including farm families, for the period beginning in 1940, and 452,000 for the period beginning in 1945, or an average of approximately 463,000 families over the 10-year period. If we take Dr. Lubin's figure and subtract it from Mr. Chawner's estimate, we find an allowance of an annual average increase in farm families of 183,000. This is an exceedingly high allowance when we consider that during the depression years the average increase in farm families was 124,000 families per year. If we assume the same proportionate increase as between farm and nonfarm families over the next 10 years as occurred in 1930-35—and this is likely to be a maximum for farm families—we would arrive at a figure of an average of 340,000 new nonfarm families over the next 10 years. However, as already stated, changes in industrial activity may bring a larger net migration to cities, which would substantially increase this figure. In addition, as indicated by testimony at the hearings, the distribution of age groupings most conducive to the formation of new families will occur in the period 1943-50, during which period there will be a considerable increase in the number of persons in the 25-to 30-year age group.³ Apparently, however, the Chawner estimates must have taken this factor into consideration.⁴

¹ Lowell J. Chawner, Residential Building, Housing Monograph Series, No. 1, National Resources Committee, Washington, 1939, p. 17.

² Hearings before the Temporary National Economic Committee, Part 11, p. 4966. (The fact that Dr. Lubin is referring to nonfarm families is indicated on p. 4967.)

³ Theodore J. Kreps, hearings before the Temporary National Economic Committee, Part 11, p. 5433

⁴ Residential Building, Housing Monograph Series, No. 1, p. 17.

THE ESTIMATED NEED VERSUS THE CURRENT RATE OF BUILDING

We have estimated that during the next 10 years there will be an increase of at least 340,000 nonfarm families per year, and since this is approximately at the rate at which we are now building, it may be said that we are now providing only for the general increase in nonfarm families. Let us look at the condition of our existing housing plant. In the first place, according to the 1930 census there were 23,236,000 nonfarm families in the United States.⁵ But according to the census definition, a family includes "a group of persons, related either by blood or by marriage or adoption, who live together as one household, usually sharing the same table."⁶ Thus, two families in the ordinary sense which share the same table, if they are related by blood or marriage, would be considered as one family. Actually what the census is defining here are households.

Nonfarm families are estimated by Mr. Chawner as 23,028,000 in 1930, a difference of 208,000 compared with the census. The same source shows that in spite of an estimated 2 percent vacancy, the ratio of families to available units in 1938 was 100.21.⁷ Consequently we may assume that in addition to the increase in number of families, there are a considerable number of doubled-up families which presumably would be prospective occupants for new construction under proper economic conditions.

Further, there is a more or less continuous demolition of structures, which has been estimated by the Bureau of Labor Statistics to average around 45,000 units a year.⁸ It may be pointed out in this connection that these 40 to 50 thousand units a year in the past have usually been demolished in order to make room for some non-residential activity. Rarely has it been found that houses have been demolished simply because they have depreciated or become obsolescent. The fact that the United States Housing Act requires demolition or effective repair of an obsolete unit for each new unit built will hardly affect the amount of demolition due to the former cause, namely, demolition to make room for some activity other than housing; and it is this cause that is responsible for the 45,000 units per year. This, incidentally, does not include destruction by fire, wind, etc.⁹

Thus we can account for a need of approximately 385,000 new units a year merely to maintain the status quo in housing. What present housing conditions are has been demonstrated by the real property inventories made by W. P. A. in 1934-36. For example, out of over 5,000,000 residential structures (representing a larger number of dwelling units) it was found that 16.2 percent were either unfit for use or in need of major repairs.¹⁰ This percentage, if applied to the available dwelling units in 1938, estimated by Mr. Chawner as 25,779,000¹¹ would indicate that over 4,176,000 were in need of major repairs or entirely unfit for use. In either case this number is in need of replacement, whether by complete modernization, effec-

⁵ Fifteenth Census of the United States, 1930, Population, vol. 6, table 17, p. 12.

⁶ *Ibid.*, p. 5.

⁷ Residential Building, Housing Monograph Series, No. 1, p. 16.

⁸ Isador Lubin, testimony, hearings before the Temporary National Economic Committee, Part 11, p. 4966.

⁹ *Ibid.*

¹⁰ Urban Housing, Works Progress Administration, 1933, table E, p. 17.

¹¹ Residential Building, Housing Monograph Series, No. 1, p. 16.

tive repair or new construction. If 16 percent of our housing plant was in need of replacement in 1938, how many units are needed each year to prevent our entire housing plant from becoming obsolete? Without replacement the housing plant of the Nation will undoubtedly get worse.

If we assume a 1 percent replacement of suitable dwelling units existing in 1938—considering 100 years as the life of the average dwelling unit in good condition we would require an average of 216,000 units a year for this purpose without improving our housing plant. Thus, after 100 years, if we replace our present suitable housing at the rate of 1 percent a year, we would still have over 4,000,000 units unfit for habitation or in need of major repairs. Consequently, upon the determination of how fast we wish to replace our existing housing units will depend the rate of the desired new construction. We have already calculated approximately 385,000 units needed just to cover the increase in families and demolitions for other than replacement with other dwelling units. Further, we can add the above-mentioned 216,000 units a year needed for replacement in order to keep our present housing plant up to its present standard. Dr. Lubin has estimated an additional replacement requirement of 200,000 units per year for the next 20 years in order to eliminate the 4,000,000 substandard dwelling units.¹² Thus, we have our choice of estimates for these 3 categories—new families, demolitions, and replacements—ranging from a minimum, estimated by Dr. Lubin, of 525,000 per year (280,000 for new families, 200,000 for replacement, and 45,000 for demolition) to 600,000 without taking into account an improvement in the general standard.

Table VI shows the number of new nonfarm units estimated to have been built annually from 1920 to 1939. For the 10-year period 1920–29 we averaged about 700,000 units per year and for the period 1930–39 only 220,000 units per year. Vacancies during the early thirties indicate that perhaps the 700,000-a-year rate was too high for complete absorption, although it must be remembered that slums existed in 1920 and also in 1930, perhaps in the same proportion. This means that if the 700,000 units a year had been built to rent or sell at the proper price levels in keeping with the incomes we might have effectively increased the standard of housing and reduced slums. Obviously, the rate of only 220,000 units a year built in the decade 1930 to 1939 means that standards have been getting much worse, since provision has been lacking even for the normal increase in number of families plus demolition requirements, to say nothing of any replacement whatsoever.

RELATION OF INCOMES TO RENTS AND COSTS

We have seen that to meet the needs of an expanding population approximately 385,000 new dwelling units are required each year, and that an added number is needed for replacement, as determined by the desired housing standards. The question may well be asked why, if our needs are only 385,000 a year for expansion, and we have built an average of 700,000 a year throughout the twenties, we have as many as 4,000,000 units which by all criteria must be classed as undesirable. In order to answer this question it is first necessary to examine the distribution of incomes in the United States and the

¹² Hearings before the Temporary National Economic Committee, Part 11, pp. 4961, 4967.

ability of families receiving those incomes to meet the costs of new housing.

TABLE VI.—*New nonfarm residential building, in the United States*

[Estimated volume, 1920-39]

Year:	Number of new dwell- ing units constructed	Year—Continued:	Number of new dwell- ing units constructed
1920.....	247, 000	1930.....	236, 000
1921.....	449, 000	1931.....	212, 000
1922.....	716, 000	1932.....	73, 000
1923.....	871, 000	1933.....	54, 000
1924.....	893, 000	1934.....	55, 000
1925.....	937, 000	1935.....	144, 000
1926.....	849, 000	1936.....	280, 000
1927.....	810, 000	1937.....	300, 000
1928.....	753, 000	1938.....	3470, 00
1929.....	509, 000	1939.....	465, 000

Source: 1920-35: David L. Wickens and Ray R. Foster, *Nonfarm Residential Construction, 1920-36*, Bulletin 65, National Bureau of Economic Research, table 1, p. 2.
1936-39: Bureau of Labor Statistics.

First, as to incomes, table VII shows, briefly, that 8½ million families out of a total of 22½ million nonfarm families earn less than \$1,000 a year; another 8½ million earn between \$1,000 and \$2,000 a year; approximately 3½ million earn between \$2,000 and \$3,000 a year; and the remaining 2 million have incomes of \$3,000 or more. In terms of percentages this means that some 90 percent of our nonfarm families have incomes of less than \$3,000 a year; 76 percent earn less than \$2,000 a year; and 37 percent earn less than \$1,000 a year. This, of course, includes relief as well as nonrelief families.

Now the question arises as to the proper proportion of a family's income which should go for housing. There have been a number of rules of thumb which have been found fairly accurate in the past for certain income classes: One of these rules is that the amount to be spent for a home should be not more than twice the annual income.¹³ Since the majority of people do not pay the full cost of the home in cash, but rather on a monthly or quarterly cost basis in interest charges, amortization, as well as the necessary costs of upkeep, and since another large portion do not own homes at all but must rent their houses, this must be converted into the question of what part of the monthly or weekly income should go for rent. Here we find a rule of thumb which says that a reasonable proportion would be not more than 1 week's salary for 1 month's rent or housing charge, whether that be in the form of actual rent or monthly cost for acquiring and maintaining a home, the latter of which includes interest and amortization charges.¹⁴

¹³ Compare Isador Lubin, hearings before the Technical National Economic Committee, Part 11, p. 4965. See also testimony of R. L. Davison, p. 4978.

¹⁴ This factor of 1 week's salary for 1 month's rent is borne out by a recent study by the National Industrial Conference Board covering the period 1909 to 1937, reported by Leigh S. Plummer, in the *Wall Street Journal* of August 23, 1939, in an article on "Spending Habits of Nation Swinging to Larger Ratio of Durable Goods." This study indicates that the amount spent for home maintenance, including furnishings, in 1909 represented 27.9 percent of the total household's annual income, and in 1937 represented 27.5 percent, indicating that the 1 week's salary for a month's rent is about average, according to experience; it also suggests that there has been little change in this percentage over a long period of years.

This is a generous percentage as compared with the average percentages of incomes spent for housing by lower-income families in 1935-36 reported by Dr. Lubin; namely, a range of 16.2 percent for families with incomes of \$1,500-\$2,500, to 22.5 percent for families with incomes under \$1,000. (Hearings before the Temporary National Economic Committee, Part 11, p. 4954; appendix, p. 5478). However, the Plummer figures represent home maintenance, including furnishings. (Compare also Hearings, Part 11, p. 4978.)

TABLE VII.—*Distribution of nonfarm families by income groups, 1935-36*

Income groups	Total number of families	Number of farm families	Number of nonfarm families	Percentage of nonfarm families by income groups	Cumulative percentage	Number of nonfarm families (cumulative)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Under \$250.....	1,162,890	832,686	330,204	1.46	1.46	330,204
\$250 to \$500.....	3,015,394	858,963	2,156,431	9.53	10.99	2,486,635
\$500 to \$750.....	3,799,215	1,108,400	2,690,815	11.89	22.88	5,177,450
\$750 to \$1,000.....	4,277,048	1,027,044	3,250,004	14.36	37.24	8,427,454
\$1,000 to \$1,250.....	3,882,444	793,250	3,089,194	13.65	50.89	11,516,648
\$1,250 to \$1,500.....	2,865,472	601,571	2,263,901	10.00	60.89	13,780,549
\$1,500 to \$1,750.....	2,343,358	433,590	1,909,768	8.44	69.33	15,690,317
\$1,750 to \$2,000.....	1,897,037	297,221	1,599,816	7.07	76.40	17,290,133
\$2,000 to \$2,250.....	1,420,883	188,336	1,232,547	5.44	81.84	18,522,680
\$2,250 to \$2,500.....	1,043,977	152,309	891,668	3.94	85.78	19,414,348
\$2,500 to \$3,000.....	1,314,199	177,927	1,136,272	5.02	90.80	20,550,620
\$3,000 to \$3,500.....	743,559	100,745	642,814	2.84	93.64	21,193,434
\$3,500 to \$4,000.....	438,428	59,883	378,545	1.67	95.31	21,571,979
\$4,000 to \$4,500.....	249,948	31,395	218,553	.97	96.28	21,790,532
\$4,500 to \$5,000.....	152,647	17,032	135,615	.60	96.88	21,926,147
\$5,000 and over.....	793,801	86,852	706,949	3.12	100.00	22,633,096
Total.....	29,400,300	6,767,204	22,633,096	100.00	-----	-----

Source: Consumer Incomes in the United States, National Resources Committee, 1938.

Column (2). Table 3, page 18, number of families.

Column (3). Total from table 10A, p. 75, total farm families in the United States: Individual items from table 9B. Appendix B, p. 97, except the classification "Under \$250," which was obtained by adding to the figure in table 9B the total number of relief farm families (total farm families in table 10A less total nonrelief farm families in table 9B). (This assumes that all relief farm families were in the lowest-income group. Since some were probably in the next group, the number of nonfarm families in the lowest-income group is probably understated and the number in the next group overstated.)

Column (4). Column (2) minus column (3).

Column (5). Percentage each item in column (4) is of total.

Column (6). Column (5) expressed cumulatively.

Column (7). Column (4) expressed cumulatively.

In table VIII we have shown that on this basis the first 37 percent, or 8½ million, of our nonfarm families could pay not more than \$20 a month for rent. Of course, a great many families who pay this amount must pay more than 1 week's salary, since a \$1,000 income is the top limit of this group, and by referring to table VII, column (7), we note that approximately five-eighths of the families are below the top quarter of the group. It has been found that some of our lower-income families pay from as high as 60 percent to more than 100 percent of their incomes. Actually, the latter means the rent charge is not paid because the income is lacking.¹⁵

The next group earning between \$1,000 and \$1,500 which is composed of 5,353,000 families, slightly more than 3,000,000 of which are in the lower half of the bracket, can pay up to \$30 a month for rent, and so on until we arrive at the group having incomes of \$3,000 or more. This group comprises only 9.2 percent of our nonfarm families, who can pay more than \$60 a month for rent or more than \$6,000 for a home.

Let us compare this with the prices of dwelling units actually erected. Data on this point are meager and hard to obtain. However, we may refer to analyses made by the Federal Housing Administration. In 1938 this agency provided insurance for mortgages on 97,645 new homes out of the grand total of 350,000 already noted in table VIII.¹⁶ The mortgages on over 94 percent of these new dwelling units, or

¹⁵ Isador Lubin, hearings before the Temporary National Economic Committee, Part II, p. 4955; Exhibit No. 843, p. 4956.

¹⁶ Fifth Annual Report of the F. H. A., for the year ending December 31, 1938, p. 63.

rather the property valuation on which the mortgages were insured, when applied to the total number of new homes built according to our estimate (see table VI), indicate that only about one-tenth of 1 percent of the new homes built in 1938 were available for those earning less than \$1,000 per annum; that only 3.7 percent, or 12,950 homes, were available for those earning \$1,000 to \$1,500, or who could pay \$30 per month; and that about 15 percent were homes costing \$3,000 to \$4,000, available to those earning \$1,500 to \$2,000. This makes a total of 19 percent, which were homes costing less than \$4,000 (practically all of which were in the range \$2,000-\$4,000), available to the 76 percent of nonfarm families having incomes of less than \$2,000, while more than 80 percent cost more than \$4,000 and were thus available only to the 24 percent having incomes of \$2,000 or more.¹⁷

TABLE VIII.—*Number and value of homes constructed in the United States in 1938 relative to income groupings*

Family income per annum	Number of nonfarm families (1935-36)	Monthly payment in dollars (not exceeding)	Maximum value of unit at 1 percent per month (dollars)	Approximate number of units built in 1938	Percentage of families provided for	Life span per unit (years)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Less than \$1,000.....	8,427,454	20	2,000	-----	-----	-----
\$1,000 to \$1,500.....	5,353,095	30	3,000	12,950	0.24	417
\$1,500 to \$2,000.....	3,509,584	40	4,000	53,200	1.52	66
\$2,000 to \$2,500.....	2,124,215	50	5,000	82,250	3.87	26
\$2,500 to \$3,000.....	1,136,472	60	6,000	79,800	7.02	14
\$3,000 or more.....	2,082,476	-----	-----	121,800	5.85	17
Total.....	22,633,096	-----	-----	350,000	-----	-----

Source:

Column (2). See table VII.

Column (3). 1 percent of column (4).

Column (4). Top of income group multiplied by 2.

Column (5). Percent distribution of property valuation of new single-family homes on which mortgages were insured by the F. H. A. in 1938, applied to the estimated number of units built in 1938 (see table VI above); former data from Fifth Annual Report of the Federal Housing Administration, for the year ending Dec. 31, 1938, table 37, p. 101. The F. H. A. distribution (single-family homes) represents 94½ percent of the total number of new dwelling units involved (derived from table 36, p. 100, of the same report). While valuations per dwelling unit averaged less for the 5½ percent which were 2- to 4-family dwellings, the resulting distribution in column (5) above does not understate seriously the number of units built at valuations below \$5,000.

This assumes that the entire 350,000 nonfarm units built in 1938 were single-family dwellings, whereas only about 80 percent were 1-family units (see the same report, p. 6). However, average valuations per unit were probably higher on multiple-family dwellings with their usually more expensive equipment and their requirement of more highly skilled labor for construction, which is also more extensively unionized labor. If average valuations per dwelling unit were any higher on multiple-family dwellings than on 1-family homes, the distribution in column (5) above does not thereby understate the number of units built at valuations below \$5,000 or overstate the number at valuations above \$5,000 (the average valuation of single-family F. H. A. units being \$5,530).

Column (6). Column (5) divided by column (2).

Column (7). 100 divided by column (6).

Estimates by the Bureau of Labor Statistics, based on an incomplete study of building permits and building prices, show that approximately 15 percent of the houses erected in 1938 were available for \$2,000 to \$4,000.¹⁸ Thus we are using here the more conservative estimates based on the valuations of the F. H. A. It is obvious, according to these figures, that new housing is not available to those earning less than \$1,000 a year, and is available only to a very limited extent to those earning between \$1,000 and \$2,000 a year.

¹⁷ Ibid., table 37, p. 101. Note source of column (6) in table VIII. Compare hearings of the Temporary National Economic Committee, Part 11, Exhibit No. 847, p. 4977, and appendix, p. 5479 (in part from different sources than the above).

¹⁸ Isador Lubin, hearings before the Temporary National Economic Committee, Part 11, pp. 4961, 4962. The 15 percent is the unadjusted figure shown in exhibit No. 846.

We have attempted in table VIII to translate the rate of building in each income group into a turn-over rate showing what the life span of the dwelling unit must be in each price group at the 1938 rate of building in order to provide all families with first-hand housing at a cost in line with their incomes. We find that those earning less than \$1,000 per year have no new building whatsoever and must depend entirely on the second-hand houses left over from the turn-over in the upper groups. In the group earning between \$1,000 and \$1,500, or with homes valued at between \$2,000 and \$3,000, the rate is 0.24 percent or a 417-year life. In the group between \$1,500 and \$2,000, or those who could afford \$30 to \$40 per month or a \$3,000-\$4,000 house, the rate is 1.52 percent or a life span of 66 years for complete replacement. Perhaps the history of our country is too short to determine the actual life span or the average annual replacement that will eventually be necessary. When that time does come there may be a complete change in the number of units found necessary for new families.

Nevertheless, we have tangible evidence of the result of our lack of present building. The fact that in 1935 we had more than 4,000,000 dwelling units that were undesirable by local standards indicates for a certainty that our replacement has not been rapid enough, and the reason why it has not been rapid enough is that we have been depending too much upon the turn-over in the upper income groups. In 1929 those earning \$3,000 or more constituted 25.5 percent of the total nonfarm families.¹⁹ In 1935-36 this group constituted 9.2 percent of the total. (See table VII.) By referring to table VIII again, we may note that at the 1938 rate of building the life span for houses in this group was 17 years. As a matter of fact, even for houses for the group earning \$2,500 to \$3,000, or for houses costing between \$5,000 and \$6,000, the life span has been only 14 years. That is, it would be necessary for the families in those income groups to purchase or rent a new house every 14 to 17 years, respectively, even to maintain the 1938 rate of building. These houses then are passed on to lower-income groups, but in order to be passed on must be depreciated to meet the renting or purchasing ability of such groups. During the depression years depreciation was much greater than in normal times, due to devaluations through foreclosure. But with our present income distribution, in order to maintain a higher rate of construction at present prices, it would be necessary to have a rate of depreciation that could occur only through depressions and panics and the resulting higher rate of foreclosure.

On the other hand, it would be possible to build at a more even rate to replace dwelling units for 1½ percent per year (which would mean a 66-year life per unit) of the 76 percent of our nonfarm families having incomes of less than \$2,000, or at the rate of 260,000 units a year for replacement, making a total of 610,000 units a year, if at least the 260,000 units were built at a cost that would make them available to 75-percent of the nonfarm population. It is quite certain that at the present rate of 350,000 per year at prevailing prices we will continue to increase our load of undesirable houses rather than reduce them. It may also be pointed out that 260,000 units a year at \$3,000 per unit means \$780,000,000 per year additional volume of construction.

¹⁹ Maurice Leven, Harold O. Moulton, and Clark Warburton, *Brookings Institution, Washington, 1934, appendix A, p. 231. America's Capacity to Consume.*

It may be noted in these conclusions that even with this 260,000 additional units, no attempt is made to take care of the deficit represented by the 4,000,000 undesirable units now existing.

When we speak of \$3,000 and \$4,000 units, we must take into account the fact that in large cities and metropolitan areas prices are much higher than in the smaller towns and the possibility of low-cost housing is much less than it is for the country as a whole. For instance, while only 19 percent of the F. H. A. single-family properties were valued at less than \$4,000 for the country as a whole, in the State of Arkansas 59 percent were valued at less than \$4,000, and in Arizona 40 percent. On the other hand, in Maryland and Massachusetts only 4 percent were valued at less than \$4,000, and in Michigan only 2 percent. As for the large cities, in the New York metropolitan area only 1 percent was valued at less than \$4,000; in Washington, D. C., 1 percent was in this class. Los Angeles, Calif., on the other hand, had 22 percent in this group, and New Orleans had 11 percent. Fort Worth, Tex., had the highest percentage, 62, in the group valued at less than \$4,000. But these are southern and southwestern cities. Data for northern cities—such as Toledo, Ohio, with 1 percent, Springfield, Mass., with 2 percent, Trenton, N. J., with 2 percent, Harrisburg, Pa., with 3 percent, and Racine, Wis., with 4 percent valued at less than \$4,000—together with the foregoing figures, indicate that only in southern and southwestern (and a few far western) cities do we have a relatively large proportion of units built to sell for less than \$4,000, whereas in most of the northern and eastern cities the number of homes provided at a price under \$4,000 is almost insignificant.²⁰

RENT AND OWNERSHIP

Much has been made of the fact, and advertisements have appeared quite often to indicate, that the monthly payments for homes costing around \$4,000 are less than \$40, and even as low as \$30 in some instances, which would make it appear that the present possibilities of meeting the need through lower cost have already been accomplished. But not all the costs of home ownership are included in advertised monthly payments. We shall not at this point enter in detail into the matter of costs, which is reserved for a later chapter, but we may say briefly that the usual items included in the advertised monthly payment represent only the financial items such as interest, amortization, and taxes. Items omitted, which would be included if quarters were rented, are heat and maintenance. Studies of apartment-house costs show that on the average from one-third to one-half of the total cost covers heat, maintenance, and other operating expenses.²¹ Thus, if such costs were included with the financial costs, it would be apparent that \$4,000 homes could not be purchased and maintained for less than \$40 per month.

²⁰ Fifth Annual Report of the Federal Housing Administration, for the year ending December 31, 1938, pp. 102, 103.

²¹ See appendix A, table B.

The census indicates that slightly more than one-half of the non-farm homes are rented. The figures for the 1930 census were:

	Percent
Owned.....	45.2
Rented.....	53.2
Tenure unknown.....	1.6

and in 1920 they were:

	Percent
Owned.....	40.0
Rented.....	57.9
Tenure unknown.....	2.1

It is quite likely that 1940 figures will be closer to the distribution of 1920 than 1930 because of the large number of foreclosures during the depression.

At any rate something more than one-half of our nonfarm families are renters and there are very good reasons for this. One important fact is that ownership, even if the monthly payments do come within the income abilities of the purchasing families, requires a down payment, which means that there must be savings equal to this down payment. The average amount of savings in the hands of renting families is not known. The initial payment on a \$4,000 home, if on the 10 percent basis, requires \$400 cash, and in addition another \$100 to \$150 for settlement fees such as title fees, brokerage, fees, etc. Thus the possibility of families becoming owners is limited by the number who have at least \$500 in cash for the initial payment.

Even those who may have the cash requirement are further limited by the migration requirements of their employment. As an example, in 1936 it was found that in Lakewood, a suburb of the city of Cleveland having a population of 70,509 in 1930, out of about 26.2 percent of the population that had moved during that year, 11 percent, or nearly 3 percent of the total families in Lakewood, had moved to another city.²³ If 3 percent of the nonfarm families in the United States moved each year to a different city, assuming that the families that move to another city at all are limited to 21 percent of the total families, this 21 percent would not be able to maintain a residence, on the average, for longer than 7 years.²⁴ Undoubtedly the ownership of a home reduces to a considerable extent the incidence of moving, but certainly during the past 9 years of scarce employment, home owners have felt restrained in job opportunities through inability to leave their present homes except at a great loss.

These considerations point to the following conclusions:

- (1) There is an annual need of at least 350,000 to 400,000 more units than are now being built in the price class below \$4,000.²⁵
- (2) At least half of such units must be available for rent until such time as annual incomes are greater.

²² Fifteenth Census of the United States, 1930, Population, vol. 6, table 16, p. 11.

²³ Arthur M. Weimer and Homer Hoyt, *Principles of Urban Real Estate*, Ronald Press Co., New York, 1939, p. 86. Since a slightly larger average percentage of the total population of metropolitan Cleveland has moved in recent years than the 26.2 percent that moved in Lakewood in 1936, the 3 percent that moved from Lakewood to another city appears to furnish a fair estimate of the percentage moving from metropolitan Cleveland to another city.

²⁴ If the movers were limited to 30 percent of the total their average residence in one place would be 10 years; if 15 percent of the total, 5 years.

²⁵ This estimate is arrived at by applying the percentage of nonfarm families in this price class (76.4) to the total estimates on p. 48 above (525,000 to 600,000), and deducting the 66,000 units built in this price class in 1938.

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CHAPTER IV

OPERATION OF THE BUILDING INDUSTRY

Since the crux of the problem lies in obtaining lower-priced homes in order to meet the needs and the incomes of the majority of nonfarm families, it may be well to examine the product and the industry which produces it.

An important division of the industry appears between single-family and apartment housing. Home ownership is concerned almost entirely with one- and two-family houses, the latter being on the decline to a point of relative insignificance at present, so far as new construction is concerned. Rental housing includes all types: single-family, two-family, and multiple-family houses. It goes without saying that different considerations apply to apartment-house buildings and to single-family residences. There are sections of the industry which are concerned only with the single-family type, and other sections which are concerned only with the large, apartment type.

In single-family residences we have numerous variations which may affect the owner and the industry as well, such as whether the house is built in a large city or in a small town, whether it is built by union labor or nonunion labor, whether or not it is subject to building code regulations, and a host of other details.

In order to obtain a background of the various elements that perform some function in building construction, let us first consider the possible methods of acquiring a new single-family home. Our prospective purchaser (1) may acquire a piece of land from a real-estate dealer, have an architect prepare plans, and award a contract to a builder or to a group of subcontractors who supervise the construction themselves or allow the architect to supervise it; (2) may purchase a new house built by a real estate operator who, in order to dispose of the land, engages a contractor to build a sample house from which the real estate operator makes sales, and who also makes the necessary arrangements for financing and acquiring title; or (3) may purchase from a speculative builder who has built a group of houses ready for sale and also takes care of arranging for financing and acquiring title. The difference between the two latter groups, which will be explained in more detail later, is that one is primarily in the real-estate business and the other is primarily in the building business. Overlapping of the two occurs very frequently, and in many cases they are interchangeable.

Another initiator of single-family houses, particularly in periods of relative prosperity, is the individual contract-builder who, in order to obtain work during periods when he has no contracts for others, may build a single-family house for sale. This type of building is not limited to those engaged in contracting, but is often undertaken by building craftsmen who have a small amount of capital and find it

profitable to utilize such capital in the erection of speculative property for sale.

In the apartment-house field we also have innumerable variations. First, there is the investor-type building: An investor arranges with an architect and a contractor to construct a building, placing the management of it in the hands of a real estate dealer engaged in the practice of management. Second, there is the speculative type, usually initiated by a promoter. The promoter approaches the architect, having obtained an option on a given site, and the architect is expected to develop plans, which are taken to a financing house for a loan. When the loan is obtained the contract is awarded and the property constructed, with the intention of selling it to an investor upon its completion.¹ During the boom period the amount of the loan was usually sufficient to provide a neat profit to all parties engaged in the promotion and construction of the speculative property, regardless of the fact that the earnings of the completed project might fail to meet the loan obligations. These properties were the first to go through foreclosure proceedings when the collapse came. A third type of building is the real estate speculative type, originated by those engaged in buying and selling real estate. These properties may be constructed for the purpose of enabling the dealer to sell a parcel of ground which otherwise might not be disposed of.

These are but a few of the types of initiators in the industry, which at the two extremes include the promoter type and the owner-participant type. They vary with location and traditional practices in different regions. For instance, in Chicago and in the Middle West generally the real estate dealer of one kind or another is the predominant type, while in the East and the far West it is the speculative builder who supplies most of the housing for sale. In small towns one is more apt to find the house built to the owner's order by a contractor, which, of course, also predominates for the more costly residences in all parts of the country.

With such a variance in the initiators of dwellings it may be readily seen that the method of operation of the housing industry is also likely to vary according to location and type. Generally speaking, the active participants in the housing industry may be classified under the following headings:

- Real estate dealers.
- Architects and engineers.
- Contractors.
- Subcontractors.
- Material dealers and manufacturers.
- Local building officials.
- Financing agencies.
- Labor.²

It is only through a more complete analysis of each of the above participating groups that we can arrive at an understanding of the immense complexities and diverse interests that have come together in what is generally termed "the building industry." The following discussion covers in large part nonresidential as well as residential building. Where it applies only to housing, that fact will usually be obvious.

¹ Compare Charles H. Lench, *The Promotion of Commercial Buildings*, Architectural Economics Press, New York, 1932, chs. I, III-V, XV.

² Labor is discussed more fully in ch. V, under "Housing costs."

REAL-ESTATE DEALERS

We have already indicated that real-estate dealers are of different types. The National Association of Real Estate Boards has divided its membership into the following classes:

(1) *Brokers*.—Those who negotiate real-estate transactions for a fee. Such transactions may be the purchase or sale of land or completed properties, either new or old. Brokers may also obtain tenants and negotiate leases for either lessee or lessor, likewise for a fee. In 1933 the broker members of the National Association of Real Estate Boards comprised approximately 80 percent of the total.³ Some of these broker members engage in other types of real-estate activity as well as that of mere brokerage. In a large number of States real-estate brokers are licensed and only such licensed brokers may engage in real-estate activities.

(2) *Land subdividers*.—The land subdivider purchases raw land, subdivides it into lots, and sells the lots to the individual home owner, who then makes his own arrangement with the architect and contractor for the building of a home; or, as many such subdividers have done in the past, he builds homes to the purchaser's order, arranging for the necessary contracts and financing. The report referred to above states that about 12 percent of the association's membership engages in this type of activity.

(3) *Home builders*.—The third type deals specifically with home ownership and is classified as the home-building division. This division comprises 10 percent of the 10,641 members of the national association. These real-estate dealers are comparable with the speculative builders of the East in that they purchase their own land—usually raw land—subdivide it into lots, build homes thereon, and sell the homes.

(4) *Mortgage brokers, etc.*—Other types of real-estate dealers are mortgage brokers, who, for a fee, will find a lender and arrange for the financing of prospective builders or purchasers, including the financing agencies for both first and second mortgages; and real-estate appraisers, who act as experts in valuations of real property.

It must be understood that there is an overlapping of the different types of real-estate activities all the way from those who engage in all such activities to those who engage in only one particular kind. In general, very little home building can be found in which the real-estate business does not enter in one way or another, but the relationships among the real-estate dealer, the purchaser, and the other elements concerned with building vary with the size and type of project, the region, etc. For instance, there may be real-estate dealers connected with houses built by speculative builders. Aside from the real-estate dealer's participation in the purchase of the land, he may also act as broker in the sale of the house.

The fees for real-estate activity vary with the type of the activity. In most communities the average broker's fee for selling residential properties (either land or dwellings) ranges from 2½ to 5 percent of the selling price.⁴ This seems to be a standard and fixed percentage, since it is common in a great many places. A builder may employ

³ Estimated from Survey of Real Estate Business, presented by the National Association of Real Estate Boards, Chicago, to the National Recovery Administration, August 1933.

⁴ On sales of over \$100,000 the rate is reduced in the Borough of Manhattan, N. Y., and perhaps in other large cities.

licensed real estate salesmen on a weekly salary basis or on a fee basis at less than 5 percent, but broker members of real estate boards have fixed the fee at 5 percent of the value. Nevertheless, in the transactions connected with one final sale a real estate broker may obtain even more than this share of the value. For instance, he may negotiate the sale of the land, for which he receives a 5-percent fee, and later, when the houses are built, he may negotiate their sale, for which he receives another 5-percent fee. Moreover, he may act as mortgage broker in obtaining the financing and receive three-fourths of 1 percent on the amount of the mortgage. Thus the real-estate business obtains a fairly large share of the total housing price. This is not to say that adequate services are not rendered for these fees but it is intended to show the type of activity which has become a very large factor in the housing industry and the proportion of the cost paid for such services.

ARCHITECTS AND ENGINEERS

There are approximately 22,000 architects connected with the building industry who are responsible for the designing of our homes.⁵ Generally the architect has functioned in such a manner as to take the responsibility for the full design of the individual house and also to act as the agent for the owner in dealing with contractors, subcontractors and others who provided the materials and labor. But with the reduction in volume in the industry there have been numerous changes. The general fee for an architect has been, ordinarily, 6 percent of the total cost of the project. In view of the work involved in the planning and providing of complete drawings for a small single-family house, very few architects can afford to provide a complete set of plans and furnish the necessary supervision for a house costing less than \$5,000. This led to the establishment of a small house service bureau by the American Institute of Architects. The service bureau provides plans for a small house at a cost much below the usual fee required, by providing stock plans, that is, plans not drawn to an individual site but suitable for a large number of sites and adaptable to changes which could be made by the builder.

The small house service bureau, while still active, has diminished in importance as a design factor—first, because plans for small-house construction can be obtained at a much lower cost from material groups such as retail lumber dealers, the American Face Brick Association, etc.; and second, because the plans produced by the small house service bureau involved housing in a much higher cost range than could be afforded by the majority of urban families. In the majority of cases a local developer will retain an architect to provide a plan which, with minor changes, may be suitable for another development. Such plans are paid for on the basis of so much a house, ranging from \$50 to \$150 for each house built from them.

The situation with respect to the engineering involved in the average single-family residence is similar. Plumbing contractors and dealers provide free engineering to meet the needs of the average single-family residence.

It has been claimed that one of the failures of the architectural profession has been its lack of ability to industrialize the housing industry. This is understandable in view of the fact that any such

⁵ Fifteenth Census of the United States, 1930, population, vol. 5, table 3, p. 47.

industrialization would tend to disturb the professional relationship of the architect to the project. Nevertheless, individual architects are giving more and more thought to the possibilities that lie in such industrialization.

CONTRACTORS

The next participant in the housing industry is the contractor. Here, again, we have different types and different scales of activity. The Census of Business, 1935, reported 8,337 general building contractors, who engaged, of course, in nonresidential as well as residential building.⁶ These were contractors regularly in business during the year, who had established places for conducting such business. This does not take into account the thousands of small enterprisers who engage in building when such activity is profitable during boom periods; nor does it include a large group of those engaged in the building industry who have some other major activity, since the rules of the census provide that each establishment be classed according to its major type of business.⁷ For instance, consider the real-estate subdivider and builder. If his major activity is real-estate sales he is classified in the real-estate business rather than in the contracting business. Likewise, retail material dealers who engage in building activity are classed as material dealers if their building activity is less than their material business.

In 1938 a special study by the Social Security Board reported 22,000 general building contractors.⁸ Since the total increase in the volume of business from 1935 to 1938 was not sufficient to account for such an increase in the number of contractors, it is evident that the difference between these two figures, namely, the 8,337 reported in the census and the 22,000 reported by the Social Security Board, represents a large number of small contractors who have no regular place of business and, therefore, were not included in the census, those engaged in building as a secondary activity, etc.

The method of operation of the general building contractor depends to a large extent upon the size of the jobs he engages in. In the construction of single-family houses, say of \$5,000 or less in value, the small contractor buys in small quantities such items as he needs from day to day almost exclusively from local retail-material dealers and local hardware stores. These operators have little capital and depend upon credit from both their subcontractors and material dealers until they receive payment for completed work. Since these contractors are dependent upon their sources of materials, they are also obligated through credit and cannot take advantage of lower prices from other sources.

On the other hand we have the larger contractor who engages in the construction of houses of, say, \$10,000 or more in value at the owner's order.⁹ Such projects are supervised by architects, and the contractor who can engage in this type of work generally has a larger amount of capital and consequently greater purchasing ability, which gives him a bargaining leverage in purchasing materials. Thus, it is often entirely possible to obtain greater value for the amount that goes into the high-cost residence than is the case with the lower-cost house.

⁶ Construction Industry, vol. 1, p. 1.

⁷ *Ibid.*, pp. VII-XI.

⁸ Hearings before the Temporary National Economic Committee, Part 11, p. 5181; exhibit No. 874, p. 5504.

⁹ This type of contractor may also build apartment houses and nonresidential buildings.

SUBCONTRACTORS

A further indication of the large number of small contractors is the fact that, in March 1938, 53 percent of all establishments had 3 employees or less, and 11 percent of all employees were employed by these small concerns.¹⁰ These employee figures, however, are based on employment by general contractors for both building and other construction and also by subcontractors; that is, employment by all contracting groups reporting to the Social Security Board. These figures indicate that a large number of builders probably are themselves craftsmen, who engage in the erection of one or two buildings a year. They are small local operators, chiefly in small communities, although the craftsmen-contractors may also be found in large cities. Obviously the small number of employees in the majority of establishments is due to the fact that much of the work is split up among subcontractors, the general contractor doing only a portion of the work.¹¹ However, this division of work is not as definite as this statement might indicate. The construction of the average house includes, in practically all cases, excavating and concreting, masonry, the principal brickwork, carpentry, plumbing and heating, electrical work, roofing and sheet-metal work, painting and decorating, plastering and lathing, and tiling. On the larger multiple-family buildings and on the higher-cost single-family residences steel and iron work might be added, as well as stone work, elevator work, ornamental iron work, and in many cases a host of other parts which appear on some types of buildings but not on others. The work usually done by the general contractor is carpentry, masonry, roofing, and excavation.¹² In some areas the general contractor is just a carpenter-contractor who sublets all other trades, including masonry. In others he may be a mason-contractor who sublets all other trades, including carpentry. Perhaps the majority of our small-home builders are carpenter-contractors. But even such carpenter-contractors at times hire masons to do the necessary masonry, and may even have small equipment to take care of their own excavation; but in the majority of cases the excavation and masonry on a project handled by a contractor whose basic work is carpentry will be subcontracted.

Out of the total of 88,833 building contractors reported by the Social Security Board in the data referred to above, 66,690, or about three-fourths, are classed as special trade contractors, or subcontractors. Moreover, as pointed out by Dr. W. L. Thorp at the T. N. E. C. hearings, there may be as many as 50,000 more operators to be added who are journeymen at times when the volume is low, but who, during periods of increased activity, assume the responsibility of a subcontract.¹³

It is this variety of types of enterprisers that has brought about many of the competitive problems in the building industry, which in turn have led to organized attempts to control various sections of it. As an example let us take the tile contractor. The tile work on a

¹⁰ Hearings before the Temporary National Economic Committee, Part 11, pp. 5182, 5183; exhibit No. 875, p. 5504.

¹¹ Of the contracting work reported in the Census of 1935, only \$356,512,000 worth, or 23.8 percent, was done by general building contractors, and \$623,319,000 worth, or 42.8 percent, was done by special trade contractors; the balance was done by heavy engineering and highway contractors. Hearings before the Temporary National Economic Committee, Part 11, p. 5503.

¹² This is only generally true; the practice varies in different communities and by size of job.

¹³ Hearings, Part 11, p. 5181.

residential building may range from merely a tile floor in a bathroom to a completely tiled kitchen and a number of bathrooms. Some of the larger enterprisers maintain showrooms where prospective owners are brought to make selections of tiles and where special designs are made up to suit the owner's taste. Obviously, such larger enterprisers have capital invested in the maintenance of a stock and a warehouse. This added overhead must, of course, be charged to the job. These contractors must compete with the craftsmen who may purchase only the necessary amount of tile for a single job and do all of the installation themselves, requiring no showroom, warehouse, or any other overhead, since craftsmen must furnish their own tools anyway.

On the other hand, the larger subcontractor is in a position to take subcontracts on multiple-family dwellings as well as on the more expensive single-family dwellings which may not be entrusted to the single-craftsman type of subcontractor. The larger subcontractor claims that if he is limited to the large subcontracts, such business restricts him and necessitates a larger overhead charge per project, making costs on the multiple-family jobs much higher than they ordinarily would be if he had sufficient business from the smaller jobs to maintain his overhead. Undoubtedly such claims are motivated by the desire to reduce competition and price cutting. This had led some of the local unions to provide rules prohibiting any of their members from taking a contract with an owner.

The situation has led to a great many jurisdictional difficulties. For instance a carpenter-contractor building a small house in some communities must sublet certain trades regardless of his ability to do the work himself. In some cities, such as Chicago and St. Louis, although the average carpenter can do all the necessary glazing on a single-family job, he would find himself in extreme difficulties with the union unless he called in a glazing subcontractor to do this work. We shall examine this type of restrictions in greater detail in chapter V.

There is another type of subcontracting which involves subcontracting only the labor. This is frowned upon in many places, particularly by unions which term this "lumping," although in some of the most notable instances of low-cost housing the greatest economies were brought about by subcontracting the labor.¹⁴ This type of subcontracting usually increases during periods of depression and is another method of reducing wages, since the contract price is set at such a point that the worker can earn the union rate only by keeping up a pace which could not be attained if he were working at the day or hourly rate. It is analogous to the gang piece-rate common in some manufacturing industries.

Thus we see that subcontracting in the building industry, which represents more than half the cost in most instances, may be interchangeable with general contracting, and may be conducted by anyone from a journeyman to a material dealer. It is the entering wedge whereby craftsmen become enterprisers in the industry.

¹⁴ Robert L. Davison, in discussing low-cost housing (hearings before the Temporary National Economic Committee, Part 11, p. 4987) cites the construction of 4-room houses in 1936 on Long Island which sold for \$2,500 each. A further investigation, which, however, was not mentioned in Mr. Davison's testimony but in a confidential report, shows that all of the labor on these houses was subcontracted to specific groups who did the labor only, while the developer furnished the materials.

MATERIAL DEALERS AND MANUFACTURERS

Material dealers may generally be divided into two groups, namely, lumber dealers and mason material dealers. The majority are lumber dealers, that is, the greatest quantity of materials is sold through lumber yards, since lumber yards are not confined to lumber, but usually include most of the principal items of hardware needed in building, as well as paints, glass, roofing materials, etc. In the 1935 Census of Business there were reported 21,149 lumber and building material dealers. This is exclusive of hardware stores, paint, glass and wallpaper stores, and electrical supply stores, which also sell materials to contractors. Altogether there are approximately 73,000 retail dealers selling materials to contractors.¹⁵ However, the term "retail dealer" may be confusing because contractors purchasing materials for a specific construction job obtain a lower price, of course, than the average lay purchaser or consumer buying material at the same places. About 8,000¹⁶ of the 21,000 full-line material dealers may be classed as "hard-material dealers," that is, those whose principal volume of sales is in plaster and masonry materials, practically all of whom handle lumber and other products as well.

We have already mentioned the fact that building material dealers also may act as contractors and assume responsibility for the complete erection of small residences. This is especially true of materials yards in small cities. Such contractor-dealers may also engage in selling coal, farm implements, and other things as well. This, of course, takes place usually in the smaller towns which, in general, do not provide enough business to warrant any substantial number of fulltime contractors.

On the other hand, there are those yards which engage in sales to contractors and to industrial plants only. The 1935 census also reports approximately 11,500 wholesalers having to do with the building industry, including agents and brokers, manufacturers' sales offices and sales branches.¹⁷ There are very few such enterprisers connected with building materials who are limited strictly to a single function such as wholesaling. For instance, a wholesaler may sell to a retail yard, but he may also sell to contractors; some sell only to contractors. Some manufacturers sell only through wholesalers or brokers; others may even sell to the consumer. This is further complicated by the fact that industrial plants, governmental bodies, and railroads are considered in the same class of purchaser as the retailer, and may often buy materials at a price lower than that quoted to contractors.

This complex system has considerable influence on the differences in contractors and their costs. We have already mentioned the fact that many of the smaller builders are limited in their bargaining ability and purchasing power due to the fact that they must depend upon the local retailer for credit. On the other hand, some contractors, even small ones, may be in such financial position that they can purchase direct from the manufacturer. In some cases the wholesaler or the manufacturer may act as subcontractor. Generally this is not true of the plumbing and heating industry, where strict lines of movement

¹⁵ Hearings before the Temporary National Economic Committee, Part 11, exhibit No. 879, p. 5506.

¹⁶ Estimated in 1934 by members of the Code Authority for the Builders' Supplies Industry.

¹⁷ Hearings before the Temporary National Economic Committee, Part 11, exhibit No. 880, pp. 5507, 5190.

have been adhered to. However, even here there is a variation by regions. In some regions the contractor may purchase plumbing and heating supplies direct from the manufacturer, and in other regions he is limited to purchasing through the jobber or wholesaler. This situation has led to attempts to control such movements by dealer organizations, in order to protect their interests by directing the lines of purchase and sale and preventing wholesalers and manufacturers from acting as subcontractors.

LOCAL BUILDING ORDINANCES

The erection of residential buildings (as well as other buildings) is hedged about by local laws and ordinances which in a large measure affect the operation of the entire industry. First there are zoning ordinances which prescribe the types of building on the basis of location. Certain kinds of residences may be built in certain zones and on certain portions of the lot. The most important local ordinances that affect the industry are building codes. These vary from city to city, although in many basic elements they are becoming standardized.¹⁸ Building codes control the type of materials used, the relationship of the materials to the design of the house as to its load-bearing and fireproofing qualities, the sanitary arrangements, and the provisions for light and air. Many of the features of local building codes having to do with materials and arrangement have been influenced by one after another particular building-material, subcontractor or labor interest, which has brought about a confusion and has localized the building industry to a large extent. These codes bring the builder and the owner into contact with local officials, since permits and inspections are required throughout the construction.

Licensing ordinances, particularly for mechanical trades such as electrical and plumbing contractors, are in effect in the majority of large cities, which tends to localize these branches of the industry and to maintain the prerogatives and jurisdiction of the licensed trades.

FINANCING AND RELATED FUNCTIONS

In view of the fact that the average house costs more than \$4,000 (only 19 percent being below that amount), it is obvious that few houses are built to sell for cash. This means that the financing of houses engages a large section of the American financing business. Financing is done through mortgages. A mortgage is an instrument which pledges the house as security for the loan required to build or purchase it. The mortgage has brought with it a whole train of laws which differ in the various States—laws determining the method of recording, the method of foreclosure, and limitations on interest.

Practically all financial institutions deal in mortgages. The principal ones are (a) building and loan associations, (b) savings banks, (c) insurance companies, and (d) commercial banks. In addition, there is a considerable amount of private lending on mortgages. Since the mortgage instrument is hedged about with State laws, it brings with it a number of functions engaged in, by, or connected with, the building industry.

¹⁸ In ch. VII below it is pointed out that more than 100 municipalities have adopted as their basic code the Uniform Building Code promulgated by the Pacific Coast Building Officials' Conference.

Our real-estate laws are such that there are different types of title, governed by different laws in the different States. The relationship of the house to the land varies in different States. This brings about the necessity for an examination of the title as related to the laws of the State, which means another fee or added cost related to the financing. Moreover, there are property liens which take precedence over the mortgage, such as taxes and assessments. These have to be examined in connection with the safety of the loan.

Thus, the building industry is surrounded by a large number of functions, due to its nature, its high cost per unit, and the laws of title, all of which add cost and act as a brake upon industrialization. They are responsible for making each project more or less individualistic, and they influence all the processes in the erection of dwellings.

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CHAPTER V

HOUSING COSTS

No phase of housing has been subject to more confusion than has "cost." This is due to the fact that those engaged in construction are concerned chiefly with construction cost. Those in the real-estate business have a broader view and consider cost to include not only the construction but the total property; while the consumer, whether he be renter or buyer, is chiefly concerned with the cost that is paid through his monthly rent or monthly payment for ownership. Hence, for purposes of clarification, we may use three terms to define the different types of cost:

(1) Over-all cost, which consists of all factors of cost entering into the finished property ready for occupancy, including the land, the house, and a host of fees connected with the purchase, construction, and sale.

(2) Construction cost includes the actual labor, materials, and builder's profit and overhead in the construction of the house.

(3) Annual cost, which is the important cost to the consumer (unless he purchases outright). Annual cost is paid either in rent or monthly payment, and consists chiefly of the financing charges, taxes, and insurance, and in certain cases, maintenance and operating costs.

The relationship of these costs differs in different types of property. table IX, following, shows the various relationships between the different elements of cost on six apartment buildings.¹ It may be noticed that the over-all cost in all six cases consists of labor, material, and contractor's overhead as construction cost, and land and fees to make up the total over-all cost. The construction cost in the examples shown ranges from 61.6 percent of the over-all cost on Knickerbocker Village to 86.2 percent on Hillside Housing. This variation represents one of the reasons why much confusion exists in the use of the term "cost" without any qualifying factors.

Knickerbocker Village was constructed in the heart of New York City on fully developed property where all city facilities such as sewers, water lines, etc., were already in existence. Consequently, land costs in the area where Knickerbocker Village was built were extraordinarily high, being 34 percent of the total. Hillside Housing was built on raw land, which necessitated the building of practically all of the usual city facilities at the time of construction of the houses. Consequently these costs were included in construction cost rather than in that of the land. Thus the time when the land improvements are made determines whether they are included in construction cost or land cost.

¹ Illustrated by charts in hearings before the Temporary National Economic Committee, Part 11, pp. 5018, 5028.

TABLE IX
BUILDING COSTS PER ROOM ON RENTAL HOUSING

Location	New York				Philadelphia		Washington, D. C.		Silver Spring, Md.		York, Pa.	
	(1)		(2)		(3)		(4)		(5)		(6)	
Name	Knickerbocker vil- lage (5,235 rooms)		Hillside housing (4,948 rooms)		Carl Mackley homes (1,085 rooms)		Brentwood village (1,506 rooms)		Falkland properties (840 rooms)		Elm Terrace Apart- ments (159 rooms)	
	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent	Dollars	Percent
Land	621	34.3	90	8.3	79	7.8	153	11.0	198	15.4	94	8.3
Fees and miscellaneous	75	4.1	59	5.5	70	7.0	121	8.7	89	6.9	99	8.8
Labor	386	21.3	355	32.5	366	36.3						
Materials	503	27.8	472	43.2	470	46.7						
Contractor overhead	227	12.5	120	10.5	22	2.2						
Total	1,812	100.0	1,096	100.0	1,007	100.0	1,394	100.0	1,287	100.0	1,128	100.0
Mortgage	1,532	84.6	993	90.6	949	94.2	1,096	78.6	1,000	77.7	887	78.6
Equity	280	15.4	103	9.4	58	5.8	298	21.4	287	22.3	241	21.4

HOUSING COSTS PER ROOM PER MONTH

	New York		Philadelphia		Washington, D. C.		Silver Spring, Md.		York, Pa.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interest	4.87	37.9	3.34	29.1	3.06	24.5	4.51	33.5	4.12	30.1
Depreciation	2.49	19.4	1.47	12.8	2.26	18.1	2.06	15.3	3.03	22.1
Operating costs	4.54	35.3	4.36	38.0	4.13	33.0	2.85	21.1	4.76	34.7
Taxes	.87	6.8	2.22	19.4	2.51	20.1	.76	5.6	1.29	9.4
Vacancy	.08	.6	.03	.7	.54	4.3	3.30	24.5	.50	3.7
Gain or loss (plus or minus)	+2.42	18.8	+3.32	2.9	-2.72	21.8	+1.00	7.4	+1.84	13.4
Income per room per month	15.27		11.80		9.78		14.48		15.54	
Cost per room per month	12.85		11.47		12.50		13.48		13.70	
Year	(1937)		(1937)		(1937)		(1933)		(1938)	
Amortization (included in "Depreciation")							1.37		1.70	
									.94	

^a First 11 months' operation; no vacancy during last 6 months.

^b First year operation.

Source: Hearings before the Temporary National Economic Committee, pt. II, Exhibit No. 855, p. 5482 (with slight modifications).

A break-down on a single-family house constructed for sale is shown in table X. Here we have an over-all cost of \$4,800, but it may be noted that only \$3,750 is the cost of the house and even here we have at least two items which are not construction costs, namely, advertising, which is a sales expense, and the architect's plans and specifications, which represent a fee. Actually we must subtract \$225 from the \$3,750 in order to obtain the construction cost, which leaves \$3,525 (out of \$4,800 over-all cost to the consumer) that might be ascribed to construction cost. However, this does not include all construction work, since in the \$350 shown as cost of lot there is some construction of roads and streets, the actual figures for which were not obtainable. But even without this we have a construction cost amounting to 73.4 percent of the over-all cost on a single-family house. In general, construction costs average between 70 and 80 percent of the complete over-all costs.

TABLE X.—Break-down of costs on a \$4,800 house for sale in 1939

Architect (plans and specifications)	\$50. 00
Hand excavating and rough grading, back fill and landscaping	52. 00
Concrete work—footing and porch material and labor	141. 00
Masonry:	
1. Material	\$294. 60
2. Labor	219. 40
	<hr/>
Lumber	514. 00
Steel—beams and lintels	530. 00
Plaster and lathing	30. 00
Millwork: Doors, sash, flooring, frames	310. 00
Glazing	210. 00
Floor sanding	43. 00
Linoleum	10. 00
Plumbing:	25. 00
Labor and material	445. 00
Septic tank cesspool	90. 00
Well and pump	174. 00
Electrical work: Wiring and fixtures	105. 00
Heating: Gas with air conditioner (includes labor and installation) ..	265. 00
Gutters and sheet metal work	61. 00
Weather stripping	10. 00
Carpenter labor	370. 00
Workmen's compensation, State unemployment tax, and social-security expense	80. 00
Finished hardware	35. 00
Drain tile (for gutter drains)	25. 00
Advertising expense	175. 00
Total cost	<hr/> 3, 750. 00 <hr/>
Selling price of house	4, 100. 00
Selling price of land	700. 00
Total selling price	<hr/> 4, 800. 00 <hr/>
Selling price of above house	\$4, 100. 00
Cost	<hr/> 3, 750. 00 <hr/>
Profit on house	350. 00
Selling price of lot	\$700. 00
Cost of lot	<hr/> 350. 00 <hr/>
Profit on lot	350. 00
Combined profit	<hr/> 700. 00 <hr/>

Source: Hearings before the Temporary National Economic Committee, Part II, exhibit No. 854, pp. 5480, 5481.

Construction costs, as above stated, consist of labor, materials, and overhead. Referring again to table IX on rental housing, it may be noted in the three examples which break down construction cost that labor cost ranges from 34.5 to 42.6 percent of construction cost, but only 21.3 to 36.3 percent of the total cost, while materials range from 45 to 55 percent of the construction cost, and 27.8 to 46.7 percent of the over-all cost. Two of the three projects were constructed on raw land, meaning that city facilities such as streets, sidewalks, sewers, and waterworks are included in the construction cost and not in the land cost, so in these cases both material and labor costs were higher as a percentage of the total cost than on the third project, but the variation was much less as a percentage of the construction cost.

On single-family residence construction there have been few surveys made showing the break-down of labor and material cost. From an example that is available—a study made by Purdue University—we find that labor represents about 30 percent of the construction cost with union wage scales paid, materials 60 percent, and overhead and profit about 10 percent.² If we take the above 73.4 percent (derived from table X) as representing the portion that construction cost is of the total, we find that labor represents only 22 percent of the total cost of a single-family house. The examples obtainable are insufficient to warrant a definite conclusion on this point, but from the evidence examined these figures appear to be typical.

Material costs on rental housing, as already cited, range from 27.8 to 46.7 percent of the total cost. Again referring to our Purdue housing project for single-family residences, we find that material costs (60 percent of construction cost, with the latter 73.4 percent of the total) represents approximately the upper end of this range, on the average, or 44 percent of the total cost. Overhead and profit range from 7 to 10 percent of the over-all (about 7 percent in the above case). Figures for the Purdue single-family project, adjusted to the actual cost (instead of using the 73.4 percent), are as follows:

	<i>Percent</i>
Operating overhead and profit.....	7.78
Materials.....	46.73
Labor.....	23.37
Land.....	14.07
Fees.....	8.05

The consumer is interested first, if he is a renter, in the amount of rent he must pay; if he is an owner or landlord, in the least amount of rent he can charge and still make a profit; if he is a home owner, in what his monthly payments will amount to. Examples in table IX show a break-down of monthly housing costs per room on the six rental housing projects. The first item is interest, which ranges from 21.8 to 37.9 percent of the total cost per room. However, this varies with the total amount of mortgage as related to the total cost, both of which are given in the above-mentioned table, as well as with the rate of interest. The mortgage ranges from 77.7 percent of the total cost in the case of Falkland Properties, to 94.2 percent in the Carl Mackley Homes. Regardless of the percentage of mortgage, the rent must bring a return on the total amount invested. Consequently rent should actually be calculated on the total cost, both mortgage and equity, rather than on the mortgage alone, since interest and

² From a special report by F. L. Davison on the Purdue University experimental housing project, House No. 1. See hearings of Temporary National Economic Committee, Part II, p. 4995.

income on the equity, that is, interest and gain or loss, represent the return on the amount invested. In the case of Knickerbocker Village this return represents 47.7 percent of the total rent, and in Hillside Housing, 31.1 percent. In terms of percentage of rent rather than of cost, an analysis of 39 apartments in New York City³ for the year 1937 shows the average interest on mortgages to be 28.7 percent of total rent. This group represents all types of apartment houses, ranging in monthly room rental from \$6.24 up to as high as \$42.32. By and large, 30 percent appears to be a fair average of the percentage of total monthly cost of rental housing that goes for interest.

The next item in rental housing is depreciation. This usually is greater than amortization, since it requires the setting aside of funds for the replacement of such items as stoves, refrigerators, and other mechanical equipment which wear out sooner than the building as a whole. Therefore we must consider that depreciation includes amortization. In these projects it ranges from 12.8 to 22.1 percent of costs. If we assume that 20 percent is a fair average, we find that interest and amortization and/or depreciation together represent one-half of the cost of rental housing.

Operating costs on the 6 projects shown in table IX range from 21 to 38 percent of total costs. However, in the record of the 39 New York apartment buildings (table B, appendix A) the average operating expense was 40.6 percent of the rental dollar. Operating expenses here include such items as fuel for heating, janitor service, painting, repairs, supplies, electricity for public spaces, advertising, insurance, and such miscellaneous items as are necessary in the operation of a rental-housing project. If we take 35 percent of costs as our average, we have 15 percent remaining as the average representing taxes and assessments, with no allowance for vacancies. Thus the cost of rental housing is divided approximately as follows:

	<i>Percent</i>
Interest.....	30
Depreciation.....	20
Operation and maintenance.....	35
Taxes and assessments.....	15
Total.....	100

A somewhat similar division applies to the single-family house. Taking the example cited in table X, and using the F. H. A. mortgage on the 25-year plan as shown in table XI, we find that on the \$4,800 selling price (house and lot) with a \$4,300 mortgage, we have a down payment of \$675, that is, \$500 down plus loan expense of \$175; and that the monthly payment, including amortization of principal, interest, taxes, and insurance, amounts to about \$30.78. What are not included but nevertheless represent monthly expense to the home owner, are such items as heat, maintenance and repairs, water charges, and so forth, which may be estimated at \$8 to \$12 per month, depending upon the area and the type of building. An examination of the operating costs of the apartment houses already referred to shows that painting and redecoration, repairs, and fuel alone take 20 percent of the total rent. This is exclusive of janitor service and includes only such costs as might occur on the individually owned home.

³ See table B, appendix A.

TABLE XI.—*Financial statement of basic house*

Selling price of house and lot (purchaser pays \$500 down, plus loan expense of approximately \$175), and secures an F. H. A. insured loan of \$4,300).....	\$4, 800
F. H. A. 25-year-payment plan on \$4,300 loan:	
Payment to principal and interest.....	25. 15
Mutual mortgage insurance premium.....	. 88
Fire and tornado insurance.....	1. 25
Taxes (estimated).....	3. 50
Total (per month).....	30. 78
F. H. A. 20-year plan:	
Payment to principal and interest.....	28. 38
Mutual mortgage insurance premium.....	. 88
Fire and tornado insurance.....	1. 25
Taxes (estimated) (per month).....	3. 50
F. H. A. financing cost based on a \$4,300 mortgage:	
Insurance.....	15. 00
Commission.....	107. 50
One-fourth of 1 percent mortgage insurance premium.....	14. 04
First month mortgage insurance.....	. 88
Abstract posting.....	10. 00
Abstract examination.....	4. 98
Application fee.....	12. 90
Interest during construction.....	6. 20
Taxes.....	3. 50
Total.....	175. 00

Source: Hearings before the Temporary National Economic Committee, part 11, exhibit No. 854, p. 5481.

We have already noted that our home owner must pay \$675 as a down payment. Allowing the same interest for his own money that he pays for the borrowed money (5 percent), we have \$2.81 per month which should be allowable as interest. Including this item as well as taxes and insurance, the monthly charges amount to \$33.59. But, as above pointed out, these costs may represent only 75 to 80 percent of the owner's total cost per month including operation and maintenance. If they represent 80 percent, the total including operating costs would be \$41.99 or nearly 1 percent of the mortgage loan. This, it must be remembered, is on a 25-year plan. For single-family home ownership the monthly cost is therefore divided somewhat as follows:

	Monthly cost	Percent
Financing (interest and amortization, which takes the place of depreciation).....	\$28. 84	68. 7
Taxes and insurance.....	4. 75	11. 3
Heat, maintenance and repairs.....	8. 40	20. 0
Total.....	41. 99	100. 0

Comparing these relative values of the various items of cost with those for rental housing (above), the higher percentages for interest and amortization in the case of the single-family home of course reflects the fact that ownership is being acquired; and the lower percentage for the maintenance item reflects the fact that service, elevators, etc., are not included.

The amount of the monthly financing cost on the single-family house is determined principally by three factors: (1) The size of the loan, which in turn depends in large part upon the actual construction and outlay cost; (2) the rate of interest; and (3) the period of amortization. The amount of interest is perhaps the most important factor of all to the home buyers since this is a direct charge on the loan.

A given percentage reduction in financing costs, as shown by the testimony of Robert L. Davison, probably has the greatest effect on the monthly fixed payment as between three items—labor, materials, and financing costs.⁴ Thus chart XI, based on the Purdue single-family project, shows that a 20-percent reduction in cost of materials would bring about a 9.3-percent reduction in monthly carrying charges; a 20-percent reduction in labor costs would bring about a 4.7-percent reduction in monthly charges; while a similar reduction in interest and amortization charges combined, would bring about a 16.7-percent reduction in the monthly charges.

The influence of the period of amortization alone is shown in table XI. A change from a 20-year to a 25-year payment plan brings about approximately a 9.5-percent reduction in monthly charges, which is slightly more than would be brought about by a 20-percent reduction in materials cost, and twice as much as would be brought about by a 20-percent reduction in labor cost. Or it may be put another way: the reduction in the monthly payment that would be achieved by expansion of the amortization period from 20 to 25 years would be equal to a 40-percent reduction in labor cost. While this is true of our example, these ratios change as the amounts change and as the rates of interest change; consequently it cannot be stated as a rule that works at all times. Nevertheless, it does indicate the large part played by financing charges and the possibility of a reduction in monthly cost, which is the eventual cost of importance to the consumer. To be sure, the extension of the amortization period for this purpose does not reduce the total amount to be paid in the whole period of liquidation; it even increases the total amount of interest paid.

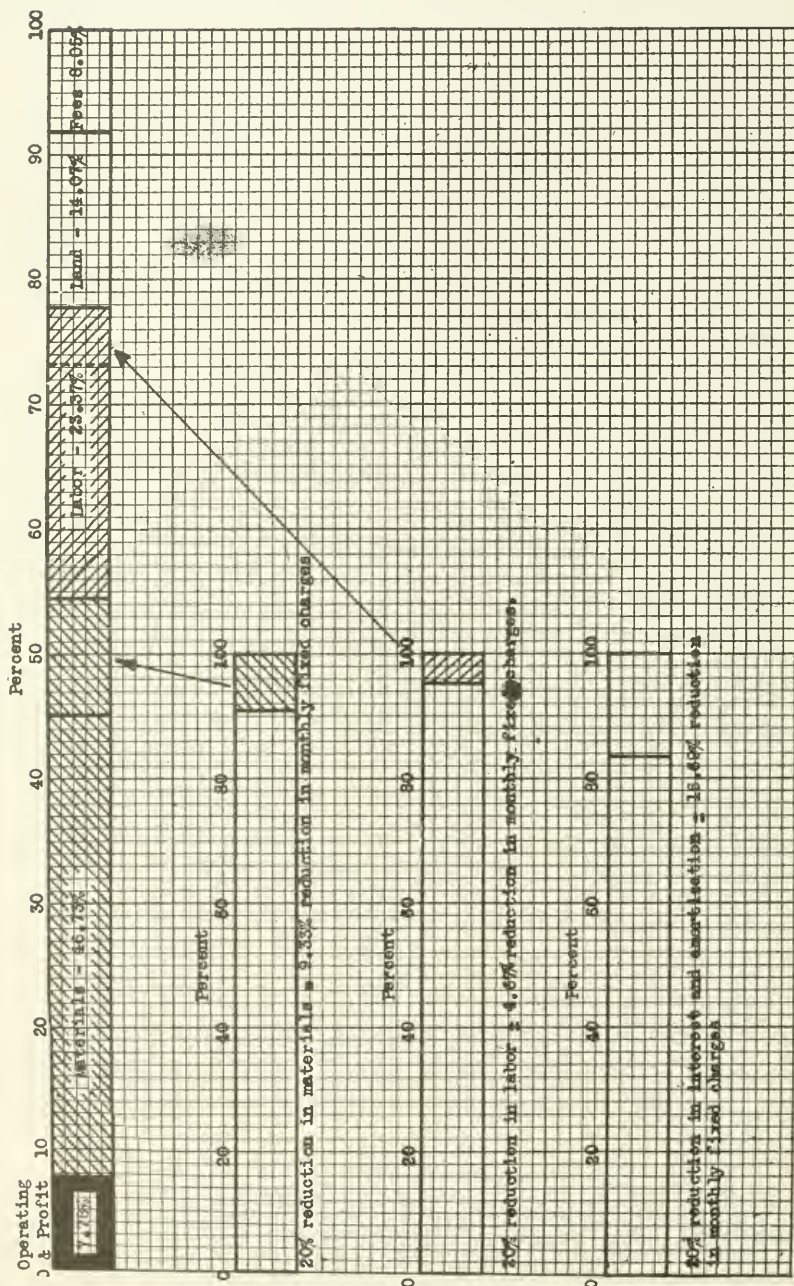
If the amount of the monthly payment as compared with monthly income is an important determinant of the effective demand for new housing, then it follows that the reductions most affecting the monthly payment are also most influential in increasing effective demand. It is also true that the amount of monthly payment is largely influenced by the original cost, since the monthly interest payment is determined by both the rate of interest and the amount of loan, while the amortization payment is influenced by the amount of loan and period of amortization. Hence, any reduction in one or all of the elements of original cost will, with the same interest rate, reduce the monthly payment. The essential point here is that it is not only the cost of materials, land, labor, etc., that affect the demand, but also the method of paying this cost.

LABOR

It has been shown that the part that labor represents in total cost will depend upon a number of factors entering into the determination of total cost. The percentage represented by the on-site labor cost may be affected by such factors as whether public facilities are

⁴ Hearings before the Temporary National Economic Committee, pt. II, pp. 4992-4994. For further discussion of the example illustrated in ch. V, see Hearings, Part II, pp. 5058-5063.

CHART XI



included in the general construction or whether they have already been installed and are purchased with the land, and whether the relationship is to construction cost or to over-all cost.

As a percentage of construction cost, labor cost probably ranges between 25 and 45 percent of the total.⁵ In the majority of residential buildings, at least single-family ones, it amounts to about 30 percent. This percentage is more specifically determined by factors such as the degree of mechanization, the efficiency of labor, the season of construction, wage rates, and the limitations determined by jurisdictional coverage on unionized jobs. This latter does not affect the individual efficiency as much as it does the efficiency of the organization doing the construction and the coordination of its activities.

Management may also influence the relative costs, determining to a large extent the amount of work done with the least effort. As an example of variable factors affecting labor costs, compensation insurance represents an important item in total labor cost, ranging from 2 to 5 percent of the total pay roll, and for some items of work it is a great deal higher. The compensation rates are fixed in many States according to the accident experience of the contractor. Moreover, different States have different basic accident rates. Carpentry, for instance, has a compensation rate of only \$1.80 per hundred dollars of pay roll in Delaware, as compared with \$11.50 in Mississippi. Structural iron and steel erection has a basic rate of \$30.61 in Arkansas, as compared with \$13.19 in Georgia.⁶ These are basic rates and are reduced in accordance with the accident experience of the contractor; hence a contractor exercising considerable care in accident prevention may have a lower labor cost than one failing to do so. The mere location of equipment in its proper relationship to the job may have an enormous influence on the total labor cost.⁷

Wage rates, of course, are important as a factor affecting labor costs. However, there is no direct relationship between wage rates and the labor-cost ratio. Examples taken from data of the Bureau of Labor Statistics in 13 cities are as follows: In Boston, with an average hourly wage payment of \$1.062 the labor-cost ratio (to construction cost) was 43.1; in Chicago, with an average wage payment of \$1.234 the labor-cost ratio was only 34.9; in Indianapolis, with a wage payment of \$0.874 the ratio was 40.3; in New York, with a wage payment of \$1.199 the labor-cost ratio was 40.4; in Trenton, N. J., with a wage payment of \$0.833 the labor cost ratio was 41.0.⁸

Thus in discussing wage rates and their trend it must be realized that wage rates constitute only one of the factors in the labor-cost ratios. Therefore, indexes of wage rates can show only trends within the area to which they apply. And, keeping in mind what we have said regarding the effect of management and efficiency, indexes of wage rates may not be indicative of labor-cost trends even within a given area.

⁵ The above-mentioned range of 34 to 43 percent (based on table IX) was on large-city projects. Note above-mentioned Purdue University study.

⁶ Construction Costs, 1937 edition, Engineering News-Record, p. 36.

⁷ On two buildings erected on opposite corners in New York City, although identical in design, there was a difference of 1 cent per cubic foot on the total building cost because materials for one had to be delivered to an inconvenient location due to the position of a fire pump at the site.

⁸ Mercer G. Evans, in Land, Materials, and Labor Costs, Housing Monograph Series, No. 3, National Resources Committee, Washington, 1939, table II, p. 79. While labor-cost ratios are from 1932 data and average wage payments are of 1936-37, it is believed that the proportionate change in wages rates between 1932 and 1936-37 was very similar in the various cities.

There are a number of indexes which are reported regularly showing the trend of hourly rates. Most important of these is the B. L. S. index, which represents union wage rates only for all building trades, and which now covers 72 cities. Based on 1929 as 100, this index dropped to a low of 86.8 in 1933, and in 1938 was 106.7, which was above 1929.⁹ Incidentally, the B. L. S. index of union rates rose from 91.6 in 1936 to 106.7 in 1938—an increase of 16½ percent. The Federal Home Loan Bank Board, which reports building costs (labor, materials, etc.) based on actual quotations to agents of that Board on a standard set of specifications, with 1936 as 100, has an average index of 111.6 for labor cost in 1938—an increase of less than 12 percent.¹⁰ Undoubtedly this difference is due in part to the fact that union rates prevail on only a limited amount of residential construction.

Actual rates in the building industry vary, and in 1936 ranged from less than \$0.225 up to more than \$1.775, according to a study by the Bureau of Labor Statistics.¹¹ This study, covering 13,267 projects in 105 cities, showed an average hourly wage rate of \$0.918.¹² In February 1939, according to the contractors regularly reporting to the Bureau of Labor Statistics but not covering the same sample as heretofore quoted, the average wage rate for all workers in private building construction was \$0.943.¹³

This difference between the average union rate and the average rate of all workers in the industry, as well as the difference between the B. L. S. index and the Home Loan Bank index, is due to the difference between union wage rates, and nonunion wage rates; and the latter index as well as the average rate for all workers, is also affected by the percentage of union workers compared with nonunion workers. This percentage varies with the type of work and the size of city. According to the study just quoted, the break-down between union and nonunion workers in the sample, which, incidentally, covered 186,145 workers, shows that 67.7 percent were union. The 13,267 projects cost approximately \$338,829,331, or something over \$25,000 per project, indicating that some large projects were included.

It is claimed by union officials, and observers seem to agree, that the percentage of union men on small residential projects is rather insignificant. According to D. W. Tracy, president of the International Brotherhood of Electrical Workers, in his testimony before the committee, as much as 90 percent of the mechanical work on single-family dwellings costing between \$3,000 and \$15,000 is done by nonunion workers.¹⁴ Of those engaged in residential building in the B. L. S. study of 1936 (covering only cities of more than 10,000), about 57 percent were union members; of those in nonresidential building about 72 percent were union members.¹⁵ The effect of unionization on the wage rate is suggested by the difference in the average wage rates on residential and nonresidential work found in this study, as follows:

⁹ Monthly Labor Review, November 1938, vol. 47, pp. 1093, 1097.

¹⁰ Federal Home Loan Bank Review, September 1939, vol. 5, p. 380.

¹¹ Monthly Labor Review, August 1937, vol. 45, p. 290.

¹² The same, pp. 283, 284.

¹³ The corresponding figure for other months is based on reports from a varying number of contractors not identical reporters. Monthly Labor Review, May 1939, vol. 48, pp. 1215, 1219.

¹⁴ Hearings before the Temporary National Economic Committee, Part 11, pp. 5264, 5266, 5267.

¹⁵ Monthly Labor Review, vol. 45, p. 297.

	Residential	Nonresidential
Skilled.....	\$1.098	\$1.179
Unskilled.....	.503	.521

For semiskilled workers there was no difference between the residential and nonresidential wage rates.¹⁶ Thus the greatest difference was in the skilled group, reflecting a smaller percentage of unionization on residential than on nonresidential building even in urban districts where the average cost of residential projects was relatively high as they included, no doubt, a large proportion of apartment-house construction (which carries perhaps as great a percentage of unionization as nonresidential building).

Another factor bringing about the high average wage rate in the building industry is the high percentage of skilled as compared with unskilled and semiskilled workers. The same B. L. S. study shows that on residential work skilled workers represented 61 percent of the total, semiskilled 22.3 percent, and unskilled 16.8 percent; on nonresidential work skilled workers represented 54.6 percent, semiskilled 23.4 percent, and unskilled 22 percent; for the total, both residential and nonresidential, the division was skilled 56.7 percent, semiskilled 23 percent, and unskilled 20.3 percent.¹⁷ According to the census of 1930, skilled workers represented 78.6 percent of total wage earners in the construction industry. (See table XII.)

These variations in the proportion of skilled to unskilled are in a large measure due to the classification of certain items of work, the tendency on the part of contractors being generally to attempt to place as many trades as possible in the semiskilled group, while the tendency of the unions is just the opposite—to place as large a portion as possible in the skilled group. This also varies by custom, which, of course, is subject to change in different cities. As an example, the placing of reinforcing rods for concrete work is under the jurisdiction of the structural iron workers union in Chicago, and workers placing reinforcing steel in that area are classified as skilled structural-iron workers. In Newark, N. J., the same work is under the jurisdiction of the metal lathers union and those engaged in this work are classified as lathers. On the other hand, in San Francisco the term applied to workers placing reinforcing rods is that of "housesmith," and they are classed as semiskilled workers. In general, where the placing of reinforcing rods is "open shop," that is, nonunion, it is classed as a semiskilled rather than a skilled operation.

Nevertheless the percentage of skilled operations for building construction is probably higher than in any other industry, and the average hourly wage rate, considering the high percentage of skilled workers as compared with the percentage in most other industries, is no higher than that of other industries, as shown in table XII.

¹⁶ Hearings before the Temporary National Economic Committee, Part 11, exhibit No. 943, p. 5574.

¹⁷ Derived from the same exhibit.

TABLE XII.—Average annual wage payments and percentage skilled workers of all wage earners, by manufacturing industries and the construction industry, 1929

Industrial group	Average annual wage payments ¹	Percent skilled workers of all wage earners ²
Printing, publishing, and allied products.....	\$1,775	69.2
Construction.....	1,770	78.6
Transportation equipment.....	1,617	37.7
Railroad repair shops.....	1,600	45.1
Iron and steel and their products, not including machinery.....	1,568	25.8
Products of petroleum and coal.....	1,556	27.2
Machinery, not including transportation equipment.....	1,497	47.6
Nonferrous metals and their products.....	1,409	29.5
Rubber products.....	1,389	8.9
Stone, clay, and glass products.....	1,317	15.2
Chemicals and allied products.....	1,261	20.2
Paper and allied products.....	1,231	13.4
Food and kindred products.....	1,198	7.5
Leather and its manufacture.....	1,129	2.4
Forest products.....	1,072	23.8
Textiles and their products.....	1,015	13.3

¹ Based on Census of Manufactures.² Based on Industrial Census of Occupations, 1930.

Source: Mercer G. Evans, in Land, Materials, and Labor Costs, Housing Monograph Series, No. 3, National Resources Committee, Washington, 1939, table VII, p. 82.

There is a considerable difference between the actual annual earnings of building workers and the earnings indicated by the average hourly rate. Material on annual earnings of building workers is extremely hard to find because of the intermittent nature of the operations. The average annual wage payments shown in table XII do not take into account the large factor of turn-over in the building industry as compared with other industries, since they are based on the average number employed throughout the year rather than on the total number so employed.

To obtain a proper background respecting the intermittent nature and the turn-over of the building industry, let us examine some of the statistics of employment. Figures for 1925, which was one of our best building years, indicate that during the peak month (November) there were 2,762,000 workers, as compared with only 1,190,000 during the low month of the year, employed on construction work, including highway and engineering work. On private building, November of that year shows an employment of 1,654,000 as compared with only 780,000 during the low month of January.¹⁸

To obtain a proper annual wage one must assume that the workers during the peak month were available throughout the year, and the total annual wage should be divided by the number working during the peak month rather than by the average number working throughout the year. According to the construction census of 1935, the average amount of salary and wage payments per person employed on all construction work let by contract was \$1,149.¹⁹ However, when we divide the total pay roll by the number employed at the peak, this annual wage payment falls to an average of about \$940 for the year 1935.²⁰

Even this adjustment does not allow for the turn-over among different occupations on different jobs, since the peak for all trades is not

¹⁸ Construction Expenditures and Employment, 1925-36, Works Progress Administration, June 1, 1937, p. 43.¹⁹ Census of Business, 1935, Construction Industry, vol. 1, p. XXX.²⁰ Derived from Census of Business, 1935, Construction Industry, vol. 2, p. 8. August was the peak month; and the percentage of value of work performed that pay roll represented (32.8) is shown on p. 4.

necessarily reached at the same time. The addition of those not employed at the peak would give a still lower average annual wage payment. This turn-over is considerable when we realize that the average period for some of the occupations in building construction on a given job may be as low as 1 week on a project that may take as long as 6 months to complete. An example is afforded by a large project covering the erection of a number of school buildings in Augusta, Ga., in 1933-34.²¹ This project involved the construction of schoolhouses having a total valuation of nearly \$700,000. The project started in December 1933 and ran through November 1934—a period of 50 weeks, 48 weeks of which were spent in actual labor operations. During the peak week, the 26th week of operation, 127 skilled carpenters were employed. This number was employed only 1 week. The next highest week listed the employment of 123 carpenters. Therefore, 4 carpenters obtained work for only 1 week.

When worked out on a number-of-weeks basis for each employee, it is found that 37 carpenters received from 1 to 12 weeks' work, 41 received from 13 to 24 weeks' work, 36 received from 25 to 37 weeks' work, and only 12 carpenters received from 38 to 46 weeks' work out of the year's job. Of the 280 laborers at the peak of the job, 67 received from 1 to 12 weeks' work, 62 received from 13 to 24 weeks' work, 117 received from 25 to 36 weeks' work, and 33 received from 37 to 48 weeks' work.

Thus, about 30 percent of the carpenters, in order to work a full year, would have had to work on four different jobs of the same size, and about 25 percent of the laborers would have had to find four different jobs of the same size operating a full year in order to get a full year's work. This project was much above the average in size for a city as small as Augusta, Ga. Actually, the building-trades worker who has a year's work on only four jobs may consider himself fortunate. This is particularly true of the mechanical trades such as electricians, plasterers, plumbers, and steamfitters.

On small residential work the turn-over is much greater than the above, but here the building craftsmen in a good many instances may work for a subcontractor quite steadily on a large number of jobs. However, even should he find himself so fortunate, there is still the factor of the seasonality of the industry, which, as already shown, may result in only about half of the workers being employed during the winter months.

All this has led to general acceptance of the fact that the building-trades worker must earn enough in a few summer months to live on during an entire year, and has been largely responsible for an ever-increasing hourly rate. There have been some attempts to promote the idea of a guaranteed annual wage but a lower hourly rate. The very nature of the industry, as above-described, operates against this, since few contractors can guarantee annual work. The fact that a contractor must bid on each job separately, and that the job itself usually operates only during a portion of the year, makes it impossible for contractors generally to assume any guaranty for a given period of work.²² Such a guaranty could apply only to the period for which an individual contractor had commitments.

Efforts have been made by a number of unions to arrange for a lower rate on low-cost residential work than the contract rate in union

²¹ Public Works Administration, *Aids to Education*, Washington, 1937, pp. 23-33.

²² Compare hearings before the Temporary National Economic Committee, Part 11, pp. 5276, 5277.

cities—this in an endeavor to increase the jurisdiction of unions on smaller residential work. For the most part this effort is not primarily altruistic on the part of the unions, since it represents an attempt to increase their membership in a class of building work over which they have little control at present.²³ But it also represents an effort on the part of the unions to increase building activity by lowering the wage rates of their members. These efforts have been spasmodic and uncoordinated, and no evidence has been adduced to show that they have resulted in the hoped-for increase in activity.

The intermittent nature of the work has also brought about many situations relative to union labor that have caused inconvenience and perhaps added cost to jobs. The fact that one trade may obtain only a very few weeks' work on a project has led to efforts on the part of unions to maintain as much of the work as possible under their particular jurisdictions in spite of changes that have come about in the use of materials. On union jobs the jurisdictional strike is perhaps one of the most uneconomical and costly to the builder, although this rarely affects single-family construction or smaller apartment-house work. It is quite understandable that every trade should attempt to get as much work as possible on every job that comes up, even at the expense of fellow union workers in other trades. This has led to a conception on the part of the public, caused chiefly by rumors but with some substance in fact, that restrictions prevail as to the amount of output allowed by the union per worker. Actually there has been no evidence of restrictions in output found in the investigations made in connection with the Temporary National Economic Committee hearings.²⁴ It is to be expected that the average union worker will attempt to get as many hours as possible out of a single job, knowing that his opportunities on each job are limited. As one writer puts it, the fear of unemployment is the most important factor in causing a worker to spread out the work over a greater length of time than necessary:

Seasonal unemployment has a very direct effect upon the efficiency of the building trades. It is fairly evident that a man will automatically restrict his production per day if he sees himself without a job when the structure is completed. He is more likely to do a normal day's work if he sees plenty of employment ahead.²⁵

Actually there have been instances where rumors as to restrictions have been investigated and found to be entirely erroneous. As an example, the Cleveland Chamber of Commerce made an investigation of home-building conditions in that city. The investigators made a special effort to discover whether there were any labor restrictions. Especially did they attempt to trace down a rumor that there was a restriction on the daily output of journeyman plumbers so that at least 2 days per fixture, or 8 days for a one-bathroom job, were required. Actually it was found that the union had put a system into operation whereby a guaranty had been given employers that the time used in installing plumbing fixtures would not exceed these amounts. According to an examination of pay rolls on a number of jobs by several different plumbers it was found that in no instance had the time consumed been as much as that allowed in the guaranty.²⁶

²³ Compare the same, pp. 5265, 5266.

²⁴ Compare the same, p. 5273.

²⁵ William Haber, *Industrial Relations in the Building Industry*, Harvard University Press, 1930, p. 117.

²⁶ Unpublished report to the board of directors of the Cleveland Chamber of Commerce, by George B. Buckley, manager of the construction industries department, September 1933, p. 5, and exhibit II.

On the other hand, there have been a number of attempts on the part of local unions to prevent the introduction of methods and materials that would reduce the volume of their portion of the work. In New York an instance was found where the electrical workers indicated that they would refuse to allow the installation of switchboards already wired at the factory. On one contemplated project the difference in cost between wiring the switchboard on the job and installing one wired at the factory was approximately \$3,000. Other instances were found where prospective builders contemplated the elimination of plastered ceilings by painting over concrete. They were notified by the union that no plastering at all would be allowed on the buildings unless the ceilings were plastered as well.²⁷ Painted concrete ceilings have been allowed in Chicago, a strong union city, for a good many years without opposition from the plasterers' union.

Table XIII represents an attempt to discover whether there is any correlation between the level of wage rates of skilled workers and volume of activity in residential building. All cities having a population of over 500,000 (estimated 1933-35) are included, and also 2 samples of cities from smaller population groups. The table shows average union and nonunion hourly rates for skilled workers in residential building in 1936, together with the percent unionized, along with residential building activity in 1936 as compared with 1933 expressed in terms of the ratio of the percentage increase in each city to the percentage increase in 257 identical cities between 1933 and 1936.

TABLE XIII.—*Residential building activity and average wage rates of skilled workers in 1936*

	Ratio of percentage increase in residential building to increase in 257 identical cities, 1933 to 1936 ¹	Average hourly rates of skilled workers in residential building ² (dollars)		Percent of these workers unionized ²
		Union	Non-union	
Cities of over 1,000,000 (estimated 1933-35):				
Chicago.....	7.42	1.50	0.79	99.2
Detroit.....	4.57	1.14	.85	33.7
Philadelphia.....	1.13	1.06	.83	65.5
Los Angeles.....	.97	1.03	.81	29.7
New York.....	.64	1.46	.92	80.5
Cities of 500,000 to 1,000,000 (estimated 1933-35):				
Buffalo.....	4.60	1.26	.78	95.5
Milwaukee.....	4.05	1.12	³ 1.38	99.3
Baltimore.....	1.67	1.12	.67	11.0
Washington.....	1.58	1.41	.84	24.3
Boston.....	.81	1.28	.87	93.2
Cleveland.....	.74	1.34	.81	94.6
St. Louis.....	.58	1.25	.81	73.0
San Francisco.....	.55	1.14	1.06	91.9
Pittsburgh.....	.44	1.30	.85	36.8

¹ Derived from data of U. S. Bureau of Labor Statistics on permit valuation of residential building in (1) all cities having a population of over 500,000 (estimated 1933-35); (2) geographically representative samples of cities in the 2 groups, 100,000 to 250,000 and 25,000 to 50,000 (estimated 1933-35) (selected from cities for which both permit data and wage rates were available); and (3) a total of 257 identical cities having an aggregate population of 44,908,300 in 1930 and including all cities over 500,000.

² From 1936 study of Bureau of Labor Statistics quoted in hearings of the Temporary National Economic Committee, pt. 11, appendix, exhibit No. 943, pp. 5574-5586.

³ Only 7 workers represented.

²⁷ Report of Feb. 4, 1939, from Bernard Topkis, investigator for the Temporary National Economic Committee, to Peter A. Stone, in files of the Temporary National Economic Committee.

TABLE XIII.—*Residential building activity and average wage rates of skilled workers in 1936—Continued*

	Ratio of percentage increase in residential building to increase in 257 identical cities, 1933 to 1936	Average hourly rates of skilled workers in residential building (dollars)		Percent of these workers unionized
		Union	Non-union	
Cities of 100,000 to 200,000 (estimated 1933-35):				
Wichita, Kans.	10.80	0.91	0.71	30.0
Miami, Fla.	9.87	1.18	.91	89.2
Nashville, Tenn.	3.64	.91	.64	82.7
Salt Lake City, Utah	2.03	1.05	.88	37.3
Grand Rapids, Mich.	1.17	.93	.57	22.0
Wilmington, Del.	.87	1.06	.87	30.0
Tacoma, Wash.	.56	1.19	⁴ 1.00	89.8
Worcester, Mass.	.39	1.04	.82	33.1
Erie, Pa.	Decline	.96	.83	29.7
Cities of 25,000 to 50,000 (estimated 1933-35):				
Albuquerque, N. Mex.	5.58	1.19	.98	68.9
St. Petersburg, Fla.	3.31	.93	.77	43.4
Fort Smith, Ark.	2.36	.96	.77	46.2
Zanesville, Ohio	1.28		1.17	0
Sioux Falls, S. Dak.	.97	1.00	.69	34.9
Fargo, N. Dak.	.72	.77	.74	38.6
Eau Claire, Wis.	.79	.81	.72	16.2
Bloomington, Ill.	.42	1.20	⁵ 1.05	78.9
Pittsfield, Mass.	.01	.94	.85	80.4

⁴ Only 6 workers represented.⁵ Only 4 workers represented.

The first group, Chicago, had the most nearly complete unionization and the highest average rate for skilled union workers on residential building in 1936 (\$1.50), also the highest ratio of percentage increase in activity (1936 over 1933) to the increase in 257 cities (7.4). Los Angeles, with the least unionization (30 percent) and the lowest effective nonunion rate (\$0.81—the rate in Chicago being ineffective), had the next-to-lowest ratio of increased activity to the increase in 257 cities—or a percentage increase slightly less than that of the 257 cities. On the other hand, New York, with 80.5 percent unionized and an average union rate for skilled workers nearly as high as that of Chicago (\$1.46), made the poorest showing in its increase over 1933 activity—0.64 of the percentage increase in 257 cities. One should note, however, that the dollar volume of residential building in both Los Angeles and New York was very high on a population basis in both 1933 and 1936 relative to the other cities of this group, so that actual activity in these two cities was greater in 1936 than is indicated by these ratios. Thus wage rates in sharp contrast in Los Angeles and New York accompany activity that in both cases represented a relatively large dollar volume. Similarly, the relatively low rates in Detroit (\$0.85 nonunion, with 34 percent unionized) are in contrast with the high average rate in nearby Chicago, but both had a high ratio of increased activity.

In the second group, among the cities in which skilled craftsmen in residential building were strongly unionized, Cleveland had the highest rate (\$1.34) with a relatively poor showing in increased residential building activity (ratio of 0.7), while Buffalo had a high wage rate (\$1.26) with the best ratio of increased activity in the group (4.6).

Baltimore, with the smallest percentage unionized (11) and the lowest nonunion rate (\$0.67), had a better-than-average increase in activity (ratio of 1.7). Pittsburgh, with effective wage rates below the average for the group considering that only 37 percent of the workers were unionized, had the lowest ratio of increased activity in the group.

In the third group (cities from 100,000 to 200,000) the highest union rates are associated with the highest percent unionized in Miami and Tacoma; but in the former the ratio of increased activity was exceptionally high (9.9 times the average increase for 257 cities), while in the latter it was exceptionally low (half the average increase). The lowest nonunion rate in the group (\$0.57) is associated with the lowest percent unionized (22) in Grand Rapids, and the increase in activity is close to the average increase (ratio of 1.2). The largest increase in activity in the group (ratio of 10.8), that of Wichita, accompanies moderately low effective wage rates (nonunion \$0.71, with 30 percent unionized). The reduced level of residential building in Erie in 1936 compared with 1933 is associated with wage rates in the middle range (nonunion \$0.83, with 30 percent unionized).

In the cities of 25,000 to 50,000, similarly, among the strongly unionized towns the highest union rate (\$1.20), in Bloomington, Ill., is associated with a very low ratio of increase (0.4), while the high rate of \$1.10 in Albuquerque, N. Mex., is associated with the highest ratio of increase in the group (5.6). The lowest nonunion rates (\$0.69 and \$0.72), in Sioux Falls, S. Dak. (35 percent unionized) and Eau Claire, Wis. (16 percent unionized), accompany increases in residential activity a little below the average.

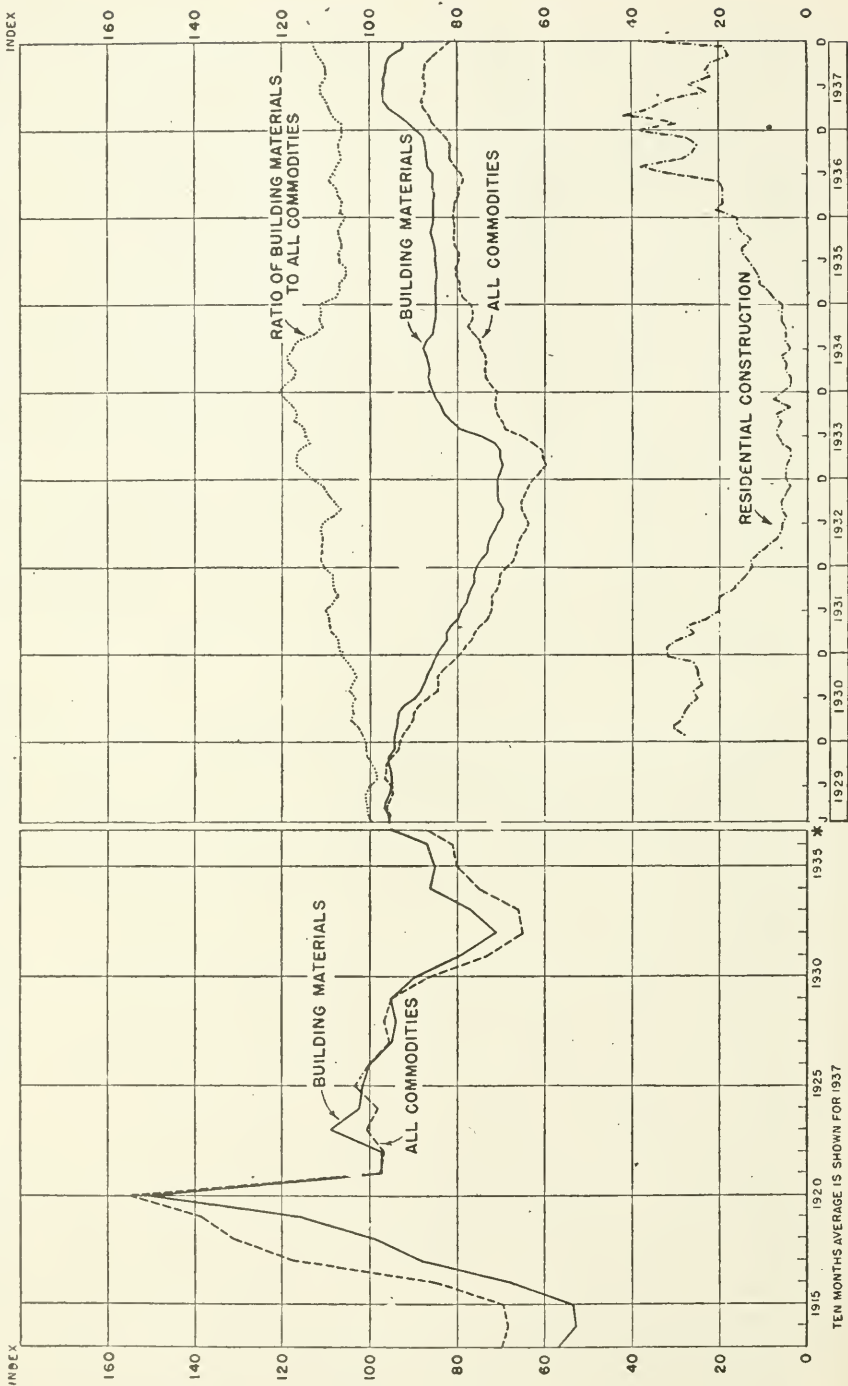
In a few instances in the several groups of cities, very high hourly rates appear to have resulted from a local scarcity of certain craftsmen—notably in Zanesville, Ohio, where the average rate for a total of 19 skilled workers in residential building, with no union members, was \$1.17 in 1936. While the percentage increase in activity in Zanesville was 1.3 times the average for 257 cities, the dollar volume in this city in 1936 was very small compared with that of most of the towns of comparable size, so that the high rate in this case is really associated with relatively low activity and presumably a rather limited number of skilled workers.

Thus no correlation whatever can be traced between 1936 wage rates of skilled workers and activity in residential building in 1936 compared with 1933 in these representative cities. On the whole there is no indication that high wage rates tend to discourage residential building or that low rates tend to stimulate it. Nor do high rates tend to accompany increased activity in any consistent way. Correlation of any kind is lacking.

Other obvious generalizations that may be made from this table are that union rates are consistently higher than nonunion (probably representing correspondingly greater skills in very many instances); that unionization tends to be stronger in the north than in the south, and in the larger cities than in the smaller; and that there is wide geographical variance in average rates, which appears erratic but presumably reflects local conditions and no doubt also the particular crafts and grades of skills represented in these averages. Needless to say, these statements are applicable only to residential building.

Altogether it seems that, while building labor has high hourly rates, these rates do not result in annual earnings any greater than in other

CHART XII. COMPARISON BETWEEN BUILDING MATERIALS PRICES AND ALL COMMODITIES WHOLESALE PRICES, 1913-37



more steady industries, and in quite a number of cases annual earnings are much lower in the case of the building trades; that the intermittent nature of the work has brought about activities on the part of the unions which have been interpreted as restrictions but which chiefly represent efforts to get more steady work; and that because our building industry is localized and intermittent, there has been little progress in its industrialization. The effect of this lack of industrialization, along with the intermittent character of employment, has been to maintain to a large extent the high hourly rates. But, according to the above study of 32 representative cities, there is no evidence that wage rates have been so high as to restrict residential building activity, or that they constitute an important factor in determining the level of such activity.

MATERIALS

The part that materials play in the total cost of housing varies according to type of building, location, method of buying, and kind of materials. The examples cited above indicate that about 45 percent of the total cost is probably the most prevalent percentage for materials. In the study by Purdue University, materials represented 60 percent of the construction cost. Just as labor costs may be influenced by the managerial ability of the contractor, so may material costs be influenced by the purchasing ability of the contractor. The small contractor who builds single-family residences, as above stated, often purchases his day-to-day needs from local hardware and retail lumber dealers. His lack of capital prevents him from obtaining the benefits of quantity purchases, even though he may require materials in quantities.

Most indexes of material prices vary as to the weightings of the several items entering into them. The Bureau of Labor Statistics publishes wholesale price indexes which represent the factory price level of building materials for each month. The movement of building materials, relative to all commodities, shows that since 1929 they have been substantially above the general level of all commodities, in spite of the fact that construction volume has been below the general level of total industrial production over the same period. This is shown in chart XII. The reasons for this will be suggested below, with consideration of specific items.

Another form of index is that of delivered material prices based on quotations to contractors, as illustrated by the Home Loan Bank Board index. The divergence of movement between the two types of index is clearly illustrated by the following table. The Bureau of Labor Statistics index ²⁸ has been converted to the 1936 base to correspond with the Home Loan Bank Board index figures from table XIV.

	Home Loan Bank Board	Bureau of Labor Sta- tistics
July 1936.....	100.0	100.0
July 1937.....	110.5	111.5
July 1938.....	104.2	102.9
July 1939.....	102.4	103.4

²⁸ From Hearings of the Temporary National Economic Committee, Part 11, pp. 5557, 5558.

Note the difference between the movements from 1938 to 1939. According to the Home Loan Bank Board index the delivered prices to contractors moved down from 104.2 to 102.4, whereas the wholesale factory index of the Bureau of Labor Statistics moved up from 102.9 to 103.4 in the period July 1938 to July 1939.

There is also a considerable difference in the movement between localities and between different materials. This is apparent from a study of prices actually paid by the Work Projects Administration, which represent perhaps as low cost as it is possible for contractors to obtain. Prices are illustrated below for the five most important items used in building construction, namely, lumber, cement, crushed stone or gravel, steel, and brick.²⁹ While others are of considerable importance those named represent the great bulk of the materials used. Although the price quoted for steel is based on that of reinforcing steel, it also represents the trend for the numerous steel items that enter into residential construction chiefly in the form of rough hardware, metal windows, etc.

TABLE XIV.—*Indexes of costs in the construction of a standard 6-room frame house*

[Average month of 1936=100]

Month	Total costs				Material cost				Labor cost			
	1936	1937	1938	1939	1936	1937	1938	1939	1936	1937	1938	1939
January	98.5	103.6	108.4	106.0	98.7	104.0	107.2	103.0	98.1	102.7	110.9	111.9
February	98.7	104.9	108.0	106.0	99.0	105.6	106.5	103.0	98.1	103.4	110.0	112.2
March	98.8	106.7	107.6	106.1	99.1	107.7	105.7	103.0	98.2	104.7	111.4	112.4
April	99.1	108.3	107.2	105.9	99.2	109.1	105.2	102.9	98.8	106.7	111.4	111.9
May	99.4	109.2	106.9	105.6	99.4	110.0	104.8	102.7	99.4	107.7	111.3	111.5
June	99.7	110.0	106.9	105.4	99.5	110.2	104.6	102.5	99.9	109.5	111.5	111.3
July	100.1	110.5	106.8	105.3	99.9	110.5	104.2	102.4	100.3	110.6	112.0	111.3
August	100.4	110.7	106.4	-----	100.3	110.6	103.4	-----	100.5	110.9	112.3	-----
September	100.6	110.5	106.4	-----	100.4	110.3	103.4	-----	101.0	111.0	112.4	-----
October	101.0	110.2	106.2	-----	100.7	109.8	103.3	-----	101.5	111.2	112.1	-----
November	101.6	109.9	106.1	-----	101.4	109.2	103.2	-----	102.0	111.2	112.1	-----
December	102.4	109.1	106.1	-----	102.5	108.1	103.1	-----	102.2	111.0	112.1	-----

Source: Federal Home Loan Bank Review, September 1939, p. 380.

It may be noted that during the same month 440 board feet of lumber of the same kind and quality ranged in cost from \$10.56 in the State of Washington to \$21.34 in Utah. This range indicates that the cost of lumber delivered to the job in some States may be as high as twice the cost in others.

Cement, which is a product with relatively fewer fluctuations, shows a range of from \$10.50 for six barrels in California to as high as \$22.08 for the same quantity in Wyoming.

Crushed stone or gravel ranged from \$9.05 for 10 cubic yards in Massachusetts to \$30.75 in South Carolina.

Two hundred and eighty pounds of steel reinforcing bars cost as little as \$6.58 in New Jersey, and as much as \$12.40 in Idaho.

Six hundred common bricks cost \$6.04 in Texas, and as much as \$15.90 in Montana. In each case the two items compared were purchased in the same month.

Considering the range over a time series, we note that while lumber was \$11 in Alabama in April 1937, on June 15 it was only \$9.24 for the same quantity, while in Wisconsin during the same period lumber

²⁹ See table C, appendix A.

went up from \$17.16 to \$19.36. Thus there is no even movement among materials as a whole. Some materials moved up while others moved down (in table C, appendix A); and upon the method of weighting will depend the movement of the index representing the total.

Another important factor in the movement of material prices and material costs is the variety in grades and kinds of materials used, much of which is influenced by building codes, although perhaps as great an amount is influenced by custom. In turn, many of the customs are influenced by climatic conditions. Obviously in large cities where fire hazards are great it is necessary to use a large amount of fireproofing materials. Where there are high land costs the attempt is generally made to construct very substantial buildings to cover a long period of amortization. On the other hand, there is no accounting for the fact that structural steel is allowed a bearing capacity of 16,000 pounds per square inch in some cities, and 20,000 pounds in others; nor for the fact that practically all contractors in Kansas City will use grade 3 and 4 common southern pine for rough lumber, while in northern cities no grade poorer than number 2 common of this species will be used for the same purpose.

An important recent development which eliminates some of the factors related to quantity purchase is the practice of using ready-mixed concrete trucked to the job rather than mixed on the job. Since prices to contractors do not always closely follow the wholesale prices of materials (see appendix B), the elimination of fabrication on the site, such as the mixing of concrete, introduces a stabilization in the cost of materials not otherwise provided.

A factor that probably has considerable effect on prices of materials is the large number of different sizes and designs which must be kept in stock by dealers. On 16 projects constructed through loans of the United States Housing Authority, no less than 56 different sizes of casement windows were used. There are 200 to 300 different sizes and varieties of interior doors. There are several hundred different varieties of molding. There are several million ways of trimming a door opening. There are 8 different combinations of wood and steel doorjamb and frames. Each one of these eight combinations may be set for different ways of opening; that is, right-hand, left-hand, right-hand reverse, or left-hand reverse. Each of these may be flat or beveled. These may again be multiplied by three different thicknesses of doors. There are at least 20 different types of locks that may be used on these 192 conditions of door and jamb. Each of these is subject to any one of 50 different types of finish.³⁰ Thus each different condition multiplies the total number of items that must be kept in stock. Most of this is taken care of by fabricators who manufacture only parts and assemble the finished product to order. This means an intermittent factory production modified, of course, by the fact that parts can be manufactured for stock, but it also adds considerably to the price.

Prices on some items used in residential construction show evidences of attempts at control. A few of these may be noted. It is well known that the price of steel is generally subject to basing-point control. Although structural steel does not enter to any extent into single-family residential construction, it is an important factor in

³⁰ General Building Contractor (F. W. Dodge Corporation), September 1931, vol. 2, No. 9, p. 58.

apartment-house construction. Structural steel in quantities purchased for a large building job is all sold by the fabricator, who quotes the price for completely fabricated steel, sometimes including erection. Rolled shapes are purchased from the rolling mills, fabricated in the fabricating shops, and delivered to the job. The price quoted is for delivery at the site, but the price is always quoted from the basing point plus delivery charges, although delivery may involve only a short truck haul from a mill not at a basing point. Undoubtedly this method of setting prices results in reducing price competition, as most economists agree.³¹

Generally speaking, the prices of steel show relatively little fluctuation. Not only is this true of structural steel, but also of reinforcing steel. In this connection it may be relevant to note that 60.6 percent of concrete reinforcing bars are produced by the four leading companies, and at least 65 percent of all structural shapes are produced by the four leading companies.³² More than one-half of the contracts for fabricated steel in the first 9 months of 1933 were booked by companies subsidiary to or owned by the two largest steel companies, namely, the U. S. Steel Corporation and the Bethlehem Steel Corporation.³³

Cement represents a considerable portion of the total volume of building materials. While there is a larger number of companies manufacturing cement than steel, the practice of pricing at basing points also prevails. Cement has shown rather a small degree of fluctuation over a long period. For instance, during the year 1934 there were only three changes in the average wholesale price, ranging from \$1.57 to \$1.65 per barrel. In 1935 there were only two changes, the price ranging from \$1.65 to \$1.67 per barrel. The average price for the year 1934 was \$1.637, and for 1935, \$1.663. During the years 1936, 1937, and 1938 not a single change in the average price per month was recorded.³⁴ This is not to say that price changes did not take place, but the changes were limited to competition between distributors rather than in the price at the plant. This in spite of the fact that only 28.6 percent of the production of 79 companies is controlled by the four leading companies.³⁵

Another material influenced by basing-point prices is gypsum. This item affects perhaps as large a part of the cost of residential construction as does cement, in view of the fact that it controls the price of plaster. Of the 18 to 23 companies producing important gypsum plasters, the 4 leading companies control 81.8 percent of prepared finish plaster, 91.5 percent of molding and gaging plaster, 83.4 percent of neat plaster, and 71.3 percent of sanded plasters.³⁶ Of the 4 companies mentioned, it is believed that each of the 2 smaller companies controls less than 10 percent of the output of these products, leaving the greater percentage (which represents well over half of the production) controlled by 2 leading companies.

Not only is the price of plaster controlled directly, but products which might be substituted apparently are also controlled by the same

³¹ See Frank A. Fetter, hearings before the Temporary National Economic Committee, Part 5, *Monopolistic Practices in Industries*, pp. 1939-1942; 1947-1949.

³² Hearings before the Temporary National Economic Committee, Part 11, p. 5529.

³³ Structural Steel and Iron Fabricating Industry, unpublished report prepared by Peter A. Stone for the National Recovery Administration, December 1933, p. 1.

³⁴ See Commodity No. 509 in *Average Wholesale Prices and Index Numbers of Individual Commodities*, published monthly by the Division of Wholesale Prices, B. L. S.

³⁵ Hearings before the Temporary National Economic Committee, Part 11, p. 5526.

³⁶ *Ibid.*, p. 5519.

companies through special patent license agreements.³⁷ The evidence indicates that the gypsum industry, through the leading producer, uses its patents on gypsum board and gypsum lath to control the price of gypsum plaster, at least to the extent of enforcing a basing-point system in that industry. For quite a period only one basing point for the Southern States (Plasterco, Va.) prevailed in the industry in spite of the fact that deposits of gypsum were worked in more than eight southern States. Recently upon the building of new plants by the National Gypsum Co. and the U. S. Gypsum Co. at Savannah, Ga., and Jacksonville, Fla., another basing point was created at Savannah.

Closely tied up with the gypsum industry is the asphalt shingle and insulation board industry. While there are a number of companies in this business, there appears to be a growing tendency toward concentration, in part in the form of an attempt by the gypsum companies to control a large part of the insulation business. This in turn is being fought by insulation board makers through their entrance into the gypsum business.

Common brick, unlike cement, steel, and gypsum, is purely a local product—at least it is a regional product—and is hardly subject to national control, although regional control is effective in a number of areas. This localization is due to the fact that brick is a bulk product and is limited in its movement from the producing plant by its weight and freight rates. It may be noted from the chart in appendix B that there has been considerable fluctuation in retail brick prices over a long period. The limitation on movement accounts for the great variation in prices between States (as shown in table C, appendix A). In Chicago, for instance, through the control of patents on brick-making machinery the price of brick has been maintained at \$11 per thousand over a great many years, regardless of conditions or volume. While this price generally has been considered by builders a reasonable one, and control cannot be said to have added to the cost of brick in the Chicago area during its enforcement, nevertheless there has been an indirect effect through the influence of the Chicago Brick Manufacturers Association in that for a number of years the industry prevented the use of back-up tile instead of brick by preventing a change in the building code.

Some attempt at control was made during the N. R. A. period, when efforts were made to fix prices in all areas, based on the average cost of doing business. This met with failure and control was unenforceable in a number of areas, chiefly due to the fact that because of the variations in methods of brick manufacturers, which have a large bearing on costs, those with lower costs refused to give up their competitive advantage during the period of low volume. Since the cost of making brick is dependent upon the type and accessibility of fuel and the method of production, and the marketing area of the product is limited by freight rates, it is easily understandable why there should be such wide variation in costs and prices.

Face brick, on the other hand, comes nearer to being made for the national market, except for the more simple types. Special colorings and finishes may be highly desirable and may enable the brickmaker to ship relatively long distances, since such types of brick come within the realm of luxury products.

³⁷ Unpublished report by George Haddock, of the Federal Trade Commission, on Patent License Agreements in the Gypsum Industry, in files of the Temporary National Economic Committee.

Lumber is a most important item in residential building and is most influential on the total cost of materials. There is no concentration of ownership in the lumber industry, the largest operator controlling less than 6 percent of the total volume, the four leading companies in the Douglas fir region producing 22.6 percent, in the Western pine 15.6 percent, and in Southern pine 7 percent.³⁸ The small percentage controlled by the four leading companies in Southern pine indicates that in this species a great majority of the production is by small producers, many of whom are farmers for a part of the year and lumber producers during the favorable season for cutting timber. Moreover, the production from these small mills affects the prices of the larger producers in other species as well, because the lumber is competitive. In spite of these factors the larger producers, through their better distributing facilities, exercise a price leadership in the metropolitan markets, which in turn influences the output of the smaller mills.

The variation in sizes and species in the lumber industry, as in brick, is in line with the variation in production cost, which is further influenced by differences in the size of standing timber in the various regions. However, lumber, unlike brick, moves in the national market, and since freight rates are a considerable factor, due to the bulk of the product, the price variations due to location may be great; that is, purchasers close to timber-producing areas have an advantage due to elimination of the item of freight.

The items that go to make up the elements of price to the consumer for the four principal types of wood used in residential construction are shown in table XV. This table shows that for Douglas fir, in 1934, mill costs were \$18.80, while freight to Chicago was \$20.16. For Southern pine, which is the principal item used in Chicago, the cost at the mill was \$25.25, while the freight cost was \$11.40. It may be noted that all three competitive items of softwood, although having different freight rates and being produced at varying distances from Chicago, are within a competitive range when it comes to the cost to the retailer, the difference in freight cost between Southern pine and Douglas fir being largely taken up by the total mill costs of the former, which, of course, include stumpage, that is, the price of the standing tree, and overhead and profit.

While what we have said about lumber applies, in general, to both rough and finished lumber, it does not include one of the important items in residential construction, namely, millwork. This may include items such as windows, window frames, doorframes, stairs, banisters, cabinets, and ornamental woodwork. In the prices of such materials we find one of the most important instances of association influence. Both the Eastern Millwork Association and the Chicago Millwork Association have developed methods of estimating which are used to a great extent by the majority of millwork producers. Base prices are given for practically every item of millwork. Variations may occur, depending upon the price and kind of lumber, but generally speaking, Cost Book A, issued by the Chicago Millwork Association, is the basis of estimating the costs and bid prices of millwork in the Midwest area, and the accounting system developed by the Eastern Millwork Association is generally used as a basis of making bids in the East.

³⁸ Hearings before the Temporary National Economic Committee, Part 11, p. 5524.

TABLE XV.—*Lumber cost at Chicago, code period, January to March 1934*

	Douglas fir	South- ern pine	Western pine	Oak
Shipping weight per M feet..... pounds.....	2,800	3,000	2,300	4,300
Freight rate per 100 pounds.....	\$0.72	\$0.38	\$9.51	\$0.295
Costs per M board measure				
Stumpage.....	\$2.42	\$4.31	\$2.11	\$6.31
Logging and milling:				
Labor.....	5.11	7.58	6.35	9.27
Other costs.....	6.58	6.13	7.77	6.91
Shipping and selling:				
Labor.....	1.06	1.61	1.90	2.35
Other costs.....	1.21	1.07	1.95	1.53
Overhead and administrative:				
Officers' and owners' pay.....	.62	1.05	.76	4.11
Other costs.....	1.80	3.50	2.60	
Total mill costs.....	18.80	25.25	23.44	30.48
Freight.....	20.16	11.40	11.73	12.75
Cost to retailer.....	38.96	36.65	35.17	43.23
Retail costs:				
Labor.....	6.89	6.48	6.22	7.64
Officers' and owners' pay.....	2.71	2.55	2.44	3.01
Other costs.....	8.13	7.65	7.34	9.03
Total cost to consumer.....	56.69	53.33	51.17	62.91

Source: Economic Problems of the Lumber and Timber Products Industry (Work Materials No. 79) National Recovery Administration, March 1936, p. 322.

The plumbing industry has developed a variation of its own, and evidence seems to indicate that the exceptionally close control enforced on the movement of plumbing materials is a result of the fact that 75 percent or more of the output of a number of important products is manufactured by the four leading producers of each.³⁹

Prices are quoted only to plumbing contractors, and sales are made through the regular channels, namely, manufacturer to jobber to plumbing contractor. The prices of plumbing fixtures have been competitively influenced only by the sales of mail-order houses, which furnish the only outlet other than plumbing contractors. The price to the consumer as quoted by mail-order houses is relatively unimportant in urban areas, in view of the fact that plumbing contractors increase their charges for installation sufficiently to overcome any differential that may result from this method of purchase. Since the price quoted to the builder is for a completely installed plumbing job, any competitive variation comes chiefly in the amount of profit the plumbing contractor will include.

Attempts are occasionally made by dealers or jobbers to sell direct to the job, but such endeavors have usually resulted in disciplinary measures being taken against the offender so that he is soon brought back into line. Evidence at hand seems to show that at least the large plumbing-fixture manufacturers readily comply in refusing to sell at the ordinary trade discounts to any jobber who is reported by the jobbers association to have sold direct to the consumer. This control over the jobbing outlets has required, of course, the support of the plumbing contractor, which has readily been given, according to all indications, since it protects him in the competitive field.

Perhaps one of the best examples of this control is provided by what is known as the Briggs bathtub case.⁴⁰ Briggs Manufacturing

³⁹ Hearings before the Temporary National Economic Committee, Part II, pp. 5200, 5210, 5542, 5543.

⁴⁰ From reports and affidavits on file with the Antitrust Division of the Department of Justice.

Co., makers of automobile bodies, had developed a method of producing colored bathtubs at a much lower cost than usual, through use of the same methods developed in making automobile bodies. Ordinarily the regular line manufacturers required a price 20 percent higher for colored fixtures than for all-white fixtures. Briggs offered to put colored fixtures on the market at the same price the regular-line manufacturers were charging for white fixtures. This was possible because of the improved method used by Briggs. The company succeeded in obtaining two or three outlets—regular distributors to the trade. However, no sooner had the Briggs product appeared on the market than its distributors suddenly found themselves faced with the impossibility of obtaining regular trade discounts on other products not manufactured by Briggs but necessary to installation. Moreover, these distributors also found themselves in difficulty with some of their customers, despite the fact that a lower price was available on the Briggs product than on the old-line products. This situation is still under investigation and subject to action by the Department of Justice, although recent indications are that the industry has agreed to let Briggs come in to a limited extent. However, except for such massive projects as the Parkchester Apartments now being built by the Metropolitan Life Insurance Co., and perhaps projects not quite so large, but larger than the ordinary run of apartment houses, the consumer can expect little in lowered prices through quantity purchases or competitive activity, since control of the price to the consumer is largely in the hands of the plumbing contractor.

Since the major portion of single-family residential building is done by small contractors and builders who, because of lack of capital and limited scope of operations, deal chiefly through retail materials dealers, the prices paid for materials to retail dealers are more important in this type of construction than are wholesale prices. The retail building materials business, however, is not comparable with ordinary retail business. The average single-family frame residence requires between 8,000 and 10,000 feet of lumber; and a \$5,000 house as much as \$2,000 worth of materials may be purchased from a single dealer.

To differentiate between the contractor and the occupant of a small house who may buy a few boards for shelving, there is generally allowed a contractor's discount, which may range from 10 to 20 percent below the list price. But, as already stated, the small contractor usually lacks sufficient capital to pay cash for his purchases and hence is often tied up creditwise with a particular retail dealer.

According to investigations during N. R. A. days the average retail mark-up in the United States as a whole, based on reports from 3,554 dealers, was 38.39 percent.⁴¹ On builders' supplies, that is, hard materials such as cement, sand, and gravel, etc., the mark-up (on less-than-carload lots) was approximately 50 percent, as an average for the country as a whole.⁴² This, of course, is not a flat rate, since, as will be explained further, certain prerogatives on bulk sales of hard materials have been enforced in the industry, requiring commissions on such volume sales to be paid whether or not handled through a retail dealer. The retail dealer is faced with the fact that on desirable orders in many cases, and particularly to contractors who are good

⁴¹ Economic Problems of the Lumber and Timber Products Industry, National Recovery Administration, p. 320.

⁴² Testimony in hearing on Code of Fair Competition for Builders' Supplies Trade Industry, N. R. A., Feb. 8, 1934.

credit risks, direct sales are made by wholesalers and manufacturers, thus avoiding the retailers' mark-up. Attempts to secure for themselves all desirable business within their territories and to eliminate direct competition of manufacturers and wholesalers have led to intermittent attempts at blacklisting by retail materials dealers, particularly through their trade associations, to prevent manufacturers and wholesalers from making direct sales. More than that, it frequently happens, especially in metropolitan centers, that a retail dealer will attempt to get an especially desirable order by increasing the contractor's discount considerably above the average discount generally in use in that territory. This is another method of making price concessions, and has also been opposed by organizational activities of competitors.

During the N. R. A. period most of the efforts of both the builders' supplies and retail lumber dealers associations were concentrated upon setting in the codes a specific mark-up below which no member of the industry might sell. These efforts merely attempted to give legality to practices that had been in effect intermittently over a long period prior to the N. R. A. The Iowa Retail Lumber Dealers Association, for instance, was formed in June 1876, and at that time a measure was adopted requiring that—

If any wholesaler shipped a carload of lumber to anyone other than a dealer, in any town where there was a member of the association, that member would notify the secretary and the latter would draw upon the wholesaler who shipped the lumber, a sight draft for \$10. The secretary was to send the money to the member whose business was being cut. If the draft was not honored, the association was pledged to a man to buy no more lumber from the offending wholesaler.⁴³

Activity of this type has been a feature of a number of associations ever since that time. It is not surprising, then, that the retail lumbermen attempted to write into the N. R. A. codes specific areas of operation and the application of a mark-up to all sales within the areas. An important controversy, which never was settled during the period of the N. R. A., revolved around what constituted wholesalers' sales, the retailers, of course, attempting to limit wholesaling to sales to retailers only, although concessions were later made to class as wholesale sales to governments, sales for large bridges, dams, and other such engineering projects requiring large quantities. On the other hand, certain types of wholesalers attempted to define wholesaling as anything consisting of more than carload lots.

In considering the activity of the Iowa Retail Lumber Dealers Association quoted above, there is considerable similarity to the more recent activity described in complaints by the Federal Trade dockets. The Florida Building Material Institute, Inc., in a complaint issued by the Federal Trade Commission in 1936 (and subsequent supporting brief) was charged with the following practices:

1. The establishment and recognition of a class of dealers to whom manufacturers, producers, and wholesalers should confine their sales.
2. The establishment and recognition of a class of manufacturers, producers, and wholesalers from whom dealers should confine their purchases.
3. The names of those concerns which were not considered as dealers under the institute's definition were published and distributed.
4. Price lists of dealer members were filed with the secretary of a district, and violators of the price list experienced considerable difficulty in securing material from the sources of supply.

⁴³ M. G. Truman, statement, hearing on Code of Fair Competition for Retail Lumber, Lumber Products, Building Material and Building Specialties Industry, National Recovery Administration, November 13, 1933, pp. 36, 37. Mr. Truman quotes R. C. Bryant, in Lumber.

5. The manufacturer who was found to be selling to a nonmember or a non-cooperative dealer was placed on a boycott list and no member of the institute would purchase materials from him.

6. Before shipments could be made, manufacturers found it necessary to communicate with the institute in order to find out whether such shipments were compatible with the institute's policies.⁴⁴

In builders' supplies the principal problem has revolved around cement sales. The cement industry usually follows the policy of distribution through dealer outlets. However, on large sales, particularly for large dams and even in some instances for large buildings requiring great quantities of cement, the manufacturer deals directly with the contractor. On such sales as these difficulty usually arises, the local dealer claiming that since the sale is in his territory he is entitled to what amounts to a commission on the entire sale, although he may have had nothing to do with it. Through the organizations of the builders' supplies dealers in the days prior to the N. R. A. code, these dealers were generally successful in maintaining a per-barrel allowance through threats of boycott. This was brought out in testimony during discussions on the N. R. A. code, one witness stating that when building supplies were bought in carload lots directly from the manufacturer, the contractor (or the manufacturer) often made goodwill payments to the dealer.⁴⁵ These payments were in the following forms:

(1) The contractor paid over a lump sum of cash acceptable to the dealer.

(2) The compensation was made directly by the manufacturer, the fee being charged to the manufacturer's sales cost.

A complaint initiated before the N. R. A. period against the Building Material Dealers Alliance and a number of other building material organizations, named the following prevalent practices:⁴⁶

1. The establishment of a class of dealers in building materials known as recognized dealers.

2. The confinement of sales to, or through the medium of, "recognized dealers" upon terms of sale which would result in a commission or profit to such dealers, by:

(a) Obtaining written pledges under threat of boycott from each manufacturer of building materials to the effect that he would support the association's program.

(b) Mailing lists of "recognized dealers" to manufacturers, with a statement of policy enclosed with each such list, which would indicate that the "recognized dealers" would sell only those brands which were marketed exclusively through such dealers.

(c) Using price lists to which "recognized dealers" would adhere, with failure to adhere resulting in removal of the designation "recognized dealers."

The principles and programs of these associations were expanded to a national scale with the formation of the National Federation of Builders Supply Associations in June 1933. As an example of policies of dealer distribution for particular major commodities of the industry, the following recommendations of the federation's cement committee were adopted at its convention in January 1936:

1. A cement manufacturer should not ship to dealer members outside their particular dealer territory.

2. The organized united should determine the selling territory of each dealer.

3. Cement manufacturers should stop all warehouse operations.

4. All trucking of cement should be stopped.

5. A minimum differential of 15 cents per barrel on sales of portland cement in carload lots should be maintained by dealers.

⁴⁴ Federal Trade Commission, Docket No. 2857. Florida Building Material Institute, Inc.

⁴⁵ B. L. Knowles (of Associated General Contractors of America), Statement, Hearing on Code of Fair Competition for Builders Supplies Trade Industry, N. R. A., February 8, 1934, pp. 35-39.

⁴⁶ Federal Trade Commission, Docket No. 2191, including findings and cease and desist order of December 30, 1937.

6. The federated units should revise lists of established dealers and furnish same to all manufacturers shipping into their territory.

7. All ethical manufacturers of cement should be given recognition in all metropolitan markets.⁴⁷

A slight variation of such retail dealer activity is found in the California Lumbermen's Council.⁴⁸ This council distributed, from time to time, rosters of its membership and its affiliates to those manufacturers, producers, and wholesalers who serviced the markets within the territorial jurisdiction of the affiliates. If a wholesaler or manufacturer sold to anyone in that territory not on the membership list, he was required to pay a penalty to the secretary; and if such penalty was not paid, the members would cease to buy from that wholesaler or manufacturer. More than that, the council fixed quotas of sales of manufacturers and wholesalers in the territory and notified its members that certain wholesalers and manufacturers were below or above their monthly quotas. This quota system also was intended to apportion business among the council's own retail members. When one of the members exceeded a given quota, the seller was instructed to raise his price in order to divert his business to some other dealer-member in the territory.

It may at once be questioned, in view of the fact that the above cases are cited from Federal Trade Commission dockets, whether these are not clear violations of the law and only spasmodic occurrences. While it is true that the instances cited did come within the purview of the Federal Trade Commission, in many intrastate cases where equally restrictive practices occurred no action could be taken because of lack of jurisdiction. In other cases where such practices may prevail, documentary evidence to that effect is not easily available, since these activities may be through verbal understandings rather than through written agreements.

In most cases such activity does not seriously affect the larger contractor—the builder of apartment houses and nonresidential buildings—but does affect to a considerable extent the small builder of single-family residences. And it is through his credit obligations to the retail dealer that the collusive action of retail material dealers may be most effective. Perhaps the chief reason why the large builder is not so easily affected by such material-dealer activities is because of the practice of a number of large wholesalers in selling direct to that type of trade, which leaves the large builder independent of the local retail dealer. Moreover, he may deal directly (in lumber, for instance) with one of the many small mills located in the lumber-producing areas.

COLLUSIVE BIDDING PRACTICES

The large builder, however, is affected by still another type of collusive activity to which the small builder is not subject. This is known as the Code of Fair Practices, recently organized and maintained among subcontractor groups. Undoubtedly the code of fair practices, with its bid depositories, is an outgrowth of the N. R. A. codes, although evidence is available to indicate that such codes of fair-trade practices have been in effect since 1921.⁴⁹

⁴⁷ *Ibid.*

⁴⁸ Federal Trade Commission, Docket No. 2898, including cease and desist order of July 23, 1938.

⁴⁹ F. J. Fee, president, Reliable Automatic Sprinkler Co., testimony, hearing on Automatic Sprinkler Industry, Amendments to Code of Fair Competition, National Recovery Administration, Feb. 19, 1935, vol. 1, pt. I, pp. 236-238. See also pp. 249 ff.

The bid depository itself is the outgrowth of practices by general contractors known as bid shopping. It is said that bid shopping is merely the application of purchasing-agent buying methods to the contracting industry. The practice complained of concerns the general contractor, who, upon receiving a subbid, calls in other subcontractors and notifies them that he has arranged for a bid of a given amount (which is much lower than the bid he actually received) but that he would be willing to give the others an opportunity to meet it or cut it. This is merely a method of bargaining as ancient as trade itself.

In order to meet this practice, subcontractor organizations set up bid depositories, requiring all members to file their sealed bids with the depository. The secretary of the association, either before or after the time for awarding the contract, would notify all the members as to the amounts of each bid deposited. The depository might be a bank or some other noninterested agency. There were innumerable variations. However, it occurred to some of the associations that, since the bid depository was used in checking each member's bid, such bids might be examined to see that they were sufficiently high to include a profit for the bidder.

In view of the fact that, as already shown, many of the subcontractors, particularly on the smaller jobs, are either intermittent contractors or journeymen (depending upon the amount of available business) the methods of estimating the cost of doing work vary with the ability of the estimator. Further, as explained above, some subcontractors in the same line, particularly the larger ones, may maintain showrooms and have a larger overhead. Such overhead would not be included in the estimates and bids proposed by the small journeymen contractors. It was then but a step to influence the smaller contractor to include a fixed sum for overhead. This might place the larger subcontractor on a par with the smaller one in his bidding. This was particularly important to the larger subcontractor in depression days when business was scarce and he tried to get some of the smaller work to meet his expenses but was faced with the competition of smaller contractors who themselves might not have the necessary capital and were accustomed to obtaining such work without the inclusion of any fixed amount of overhead. While most of the subcontractor codes were so written during the period of the N. R. A., there was difficulty in their enforcement, and during the latter days of code writing the setting up of accounting systems with mandatory overhead was strictly prohibited.

When and how the more recent wave of bid depositories and codes of fair competition came into existence seems to be in doubt. It appears that following the passage of a fair trades act in California a group of plumbing codes was set up in California cities in 1936. At least evidence adduced by investigators of the P. W. A. shows such codes of fair competition have existed. Throughout 1936, 1937, and 1938 there were more of these bid depositories in other trades, with codes providing for mandatory overhead, but now they were supported by agreements with the building trades union of that particular trade, as a means of enforcing such codes. The unions agreed to refuse to supply labor to any subcontractor not certified or failing to cooperate with such bid depository or code of fair practice. That this has affected the large contractors only is adduced from the fact that in

practically all of the code activities uncovered recently an exemption of a fixed amount ranging from \$100 to \$300 has been allowed subcontractors.

Usually the explanation given by labor for policing such codes is to the effect that if a contractor fails to include a sufficient amount in his bid to cover his overhead he may be forced to resort to the practice of "kick-backs" from his labor in order to come out ahead, and it is protection against "kick-backs" that the unions seek in this policing.

An example of the way this support operates is shown in the case of Portland, Oreg. Agreements were signed between the plumbing and steamfitters unions and what was set up as an "industries service" bureau, composed of all plumbing and heating contractors in Portland. The agreement stipulated—

The local reserves the right to withdraw their membership from any person or firm who resorts to unfair practice or unfair competition. * * * Members will be permitted to work only for persons having a legitimate place of business as master plumbers or steamfitters, who agree to these working rules, with the exception of special lines such as ice machines, pneumatic tubes, sprinkling, marine work, and thermostatic work. A legitimate place of business means a storeroom, business telephone, material and tools of a value of at least \$1,000.

And again in section 23 of the agreement—

Local No. * * * reserves the right to cancel this agreement with any person or firm who resorts to unfair practice or unfair competition with other first parties to similar agreements.⁵⁰

In actual operation summary sheets of each bidder were submitted to the industries service. These sheets were checked for errors and omissions and to see that they included the required minimum of 20-percent overhead, as well as a minimum 5-percent charge made by the industries service. The agreement also contained a clause which waived all conditions on projects of the Public Works Administration or other Federal Government work. However, it appears that this waiver was placed in effect after many of the Federal agencies added a clause to their specifications requiring all bidders to submit an affidavit stating that they had arrived at their bids without collusion or agreement with other contractors or bidders.

Altogether the P. W. A. investigated and found, from 1936 through 1938, such bid depositories covering 22 different trade groups in 14 cities. In most cases there was an exemption covering small residential projects on which the subcontractor's estimate was limited, as above stated, to \$100 to \$300; and since 1937 exemptions have been made on Federal work or on projects where Federal funds were involved.

These activities have had little effect, if any, on small single-family residential building, not only because of the above-mentioned exemption but because the major portion of this work is not affected by union agreements. However, these practices have been the principal factor recently in raising costs on apartment-house construction and on nonresidential building. Two examples may suffice to show the degree of effect in such instances.

One bid depository in New York City, not included in the P. W. A. investigations, was that of the general contractors engaged in plastering through the establishment, in June 1937, of a plasterers' code

⁵⁰ Public Works Administration, Division of Investigation, Report No. Misc. 16342, August 30, 1938.

committee. This committee had the usual rules applying to bid depositories, with amendments from time to time. (See copy of code in appendix C.) About this time a new building code allowed for the first time the use of painted concrete ceilings, without plaster, in residential buildings. Immediately the plasterers' code committee issued a ruling that no contractor was to bid on a project unless ceilings were plastered, as well as the walls. One exception to this has been the use of metal ceilings, which have long been used in place of plaster. It is understood that since the T. N. E. C. hearings started the code committee has revoked this ruling.

Another instance in New York is that of the electricians' code body, which refused to install a factory-wired switchboard and insisted that it be wired on the site.⁵¹ It is claimed by one prospective builder in New York that these code activities have been responsible for raising the estimated cost of residential building in New York City above the 1926 cost.⁵²

Altogether, it appears that the small builder is handicapped by lack of capital and by the activities of material dealers' associations which restrict him in his purchases to the extent that he is unable to get materials at lower prices; but on the other hand, the larger contractor who may obtain lower prices by purchases of materials in greater volume direct from the wholesaler or manufacturer, is faced with higher costs from subcontractors through their organizational activities in connection with union agreements. Between the two, costs of materials in place on residential buildings have been maintained at a level above the average of all other commodities.

FEES AND MISCELLANEOUS COSTS

The various fees involved in producing housing and getting it into the hands of the user fall into three different classes. First are those fees relating to the construction of the house itself (including purchase of the land). They include such items as architects' fees, builders' fees or profit, surveys and permits, surety bonds, and other forms of insurance necessary to the job.

The builders' fee and architects' fee, depending on the point of view, may be considered as part of the construction cost, the same as that of labor. An indication as to their part of the total cost of single-family housing is arrived at by examination of various examples of small-house construction. In some cases the builder's fee may come in the form of profit, where a builder of the speculative type builds and sells. In the example given in the earlier part of this chapter (table X), the builder's profit is clearly divided as between profit on the lot and profit on the cost of the house. It may be noted that exclusive of advertising expense the cost of this house was \$3,575. A builder's profit was allowed amounting to \$350, while the architect's fee in this case was \$50. Clearly the architect's fee, considering the amount of work involved, does not cover individual plans and specifications for this house, but is for a basic design for a large group of houses which have been repeated. If individual plans and specifications had been provided for the house, the fee would be nearer \$300 or approximately equal to the builder's fee.

⁵¹ Report of February 4, 1939, from Bernard Topkis, investigator for the Temporary National Economic Committee to Peter A. Stone, in files of the Temporary National Economic Committee.

⁵² *Ibid.*

There are usually other fees involved in construction. Permits and surveys amount to between \$40 and \$50 per house, depending on the size. One example reported shows that in Racine, Wis., on a house selling for \$4,645 the permits and insurance amounted to \$40, the surety bond \$20, and fire insurance \$5, or a total of \$65. For a house on the outskirts of Milwaukee costing \$4,465, permits and insurance were \$50, surety bond \$20, fire insurance \$20, or a total of \$90.⁵³ Insurance and surety bonds, of course, cover only the period of construction. In the latter case (the Milwaukee house) the builder's fee was \$300 and the architect's fee \$200, while in Racine the builder's fee was listed at \$300 and the architect's fee at \$75. Altogether, in the Racine house costing \$4,645 the fees applicable to the heading of "Construction" were as follows:

Permits and insurance.....	\$40
Builder's fee.....	300
Architect's fee.....	75
Surety bond.....	20
Fire insurance.....	5
Total.....	440

or slightly less than 10 percent of the selling cost. (This does not include \$10 interest on the construction loan, which will be taken up under another heading.)

The second kind of fee relates to title and conveyance. These fees are applicable to parts of the transaction for which the service rendered is not so clearly defined. The necessity for such fees is chiefly the result of different types of State laws relating to title and conveyance. Many of these laws are enforced through traditional loan practices. Titles are examined and guaranteed in different manners in different States.

There are four principal types of title procedure and examination. Two of these are: The making of abstracts of title by professional abstracters; and attorney's opinion. The latter is a system whereby an opinion on the validity of the title by an attorney is accepted by the lending agency as sufficient guaranty for its loan. Abstracts of title are also examined by an attorney. The third type is title insurance, which is provided by insurance companies engaged in that type of activity. The insurance company, of course, makes its own examination of title and provides regular insurance against any fault in such title. In many cases, principally in New York, lending agencies insist upon title insurance as a guaranty of title where their loans are involved.

The fourth type of title procedure is known as the Torrens system. This is a method of title registration which, after the initial registration cost, requires no further abstract or title search but merely examination of title by an attorney. A report by Wallace H. Walker and Spurgeon Bell, covering title procedure in 10 States, showed that the average total costs, including attorney's fees, of original registration of title to a home property where Torrens titles were legal, was \$150.⁵⁴ However, the average cost of conveyance of such title after original registration was only about \$8.06 per \$1,000 of loan.⁵⁵ It was

⁵³ Reports of Richard F. Jones, Jr., dated February 2 and February 5, 1939, in files of the Temporary National Economic Committee.

⁵⁴ Central housing committee, subcommittee on law and legislation, Land Title Procedure with Particular Reference to the Legal Costs of Home Mortgage Loans, Washington, August 1936, p. 3.

⁵⁵ A weighted average representing 1,395 loans in 3 States; based on the same, pp. 6 ff.

found that Torrens or similar land-title registration existed in 17 States and the Territory of Hawaii, but were utilized to any extent in only 3 or 4 States and Hawaii.⁵⁶ In a number of States, in spite of the Torrens law, title insurance companies are active and title policies are insisted upon by some mortgage lenders.⁵⁷

The findings of the Walker-Bell report indicate that the average cost of transferring title without the Torrens law ranges from as high as \$19.89 to as low as \$9.42 per thousand dollars of loan. With the Torrens law, the low was an average of \$6.02 in Massachusetts, and the high \$10.38 per thousand dollars of loan in Minnesota. Hence on a house costing \$5,000 (assuming a 90-percent loan) the title fees may run from \$27 to \$90, depending upon the practice in the State, the title laws, and the type of title guaranty demanded by the lending agency.

Other fees involved in transferring property include such items as recording of deed, tax-search fees, release fees, escrow fees, and others depending upon the State and the practices within the State. On the whole the closing costs and fees related to conveyance on a small house will average between \$55 and \$120.

The third kind of fee relates to loans. While it is true that some of the necessary fees involved in title procedure are due to the demands of lending agencies, they are not strictly fees relating to the loan, since they relate primarily to title and may be demanded even where no loan is involved. Loan fees constitute a special group in themselves. Referring to table XI, the example presented at the hearings, it may be noted that the abstract posting and abstract examination, which are distinctly title fees, are included in the \$175 financing cost on a \$4,800 house. The loan items involved are mortgage insurance, mortgage commission, application fee, interest during construction, and taxes during construction. In the Racine case above mentioned we find interest during construction, mortgage insurance, examination fee, financing expense (which is comparable with the item of commission in the other statement noted) and probably some expenses listed under "miscellaneous."⁵⁸ Outstanding factors in this set of fees, which are always present are the application fee—or the examination fee which is sometimes termed "appraisal"—and the mortgage commission.⁵⁹

The application fee ranges from \$5 to \$15, depending upon the size of the job and on whether it is an F. H. A. mortgage or some other type of mortgage. The examination fee in one case above-mentioned was \$10, and in another \$5. Perhaps \$5 is the most frequent charge for this item on the small house costing \$5,000 or less.

The broker's commission was \$107.50 on the \$4,800 house in Cook County, Ill. (table XI), and it was \$100 on the \$4,645 house in Racine, Wis. The usual broker's charge is three-fourths of 1 percent of the mortgage, the charge varying with the size of the loan, on the theory that the larger loans are more difficult of placement than are the

⁵⁶ *Ibid.*, p. 2.

⁵⁷ *Ibid.*, pp. 63, 67, 68. Apparently the Torrens system does not provide the service desired by many nonresident lending institutions. For explanation of the systems of title examination and proof, see also W. H. Walker, hearings before the Temporary National Economic Committee, Part II, pp. 5169-5170.

⁵⁸ Report of Richard F. Jones, Jr., dated February 2, 1939, in files of the Temporary National Economic Committee.

⁵⁹ Some lending-institution witnesses, notably Henry Bruere, president of the Bowery Savings Bank, and R. R. Rogers, vice president of the Prudential Insurance Co., testified that they are now absorbing the broker's commission themselves. (Hearings before the Temporary National Economic Committee, Part II, pp. 5073, 5074, 5121.)

small ones. There is, however, an attempt to maintain a basic minimum of \$100, which, of course, is not always enforced.

Thus we find that on a house costing slightly under \$5,000, all three types of fees (construction, title conveyance, and loan fees) may amount to as much as \$650.

On rental house construction the examples shown in table IX indicate that combined fees may range from 4 percent to as high as 9 percent of the total cost.⁶⁰ Using our \$650, on the basis of a \$5,000 house, the combined fees may average 13 percent of the selling price. This 13 percent does not include advertising expense or selling cost, except where the builder's profit includes the selling cost. It may be noted also that this amount (\$650) is equivalent, or nearly so, to the average cost of the land for small residences;⁶¹ and in two of the six rental-housing projects shown in table IX the fees are almost equivalent to the cost of the land.

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⁶⁰ Here some of the items are probably classified differently; e. g., the builder's profit would probably appear in the "Contractor overhead" instead of in "Fees and miscellaneous."

⁶¹ Note percentage break-down for Purdue single-family project above (p. 44); the percentage for fees plus operating overhead and profit exceeds that for land.

- Public Works Administration, Division of Investigation, Report No. Misc. 16342, August 30, 1938.
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CHAPTER VI

HOUSING FINANCE

As stated in the preceding chapter, the important cost to the renter is the monthly rent, and since interest takes from 28 to 30 cents of each rental dollar,¹ the financial factors are important in rental housing. In home ownership the monthly cost is composed chiefly of interest and amortization of the loan. Of the home-ownership monthly payment plus cost of operation and maintenance, the financing charges amount to as much as 69 percent.² This is important because the amount of funds involved in the outright acquisition of residential facilities is beyond the average amount of savings of the individual. The 1930 census shows that 45.2 percent of all nonfarm homes are owned.³ Of these owned nonfarm homes, about 58 percent were mortgaged in 1934⁴ leaving only 19 percent of the total nonfarm homes owned free and clear by the occupant.

Figures on total funds invested in residential nonfarm mortgages have been estimated for various years, ranging from a peak of \$22,300,000,000 in 1930 to \$17,300,000,000 in 1937.⁵ This comparison probably is not altogether valid in view of the fact that the 1937 figures are estimates of the Federal Home Loan Bank Board and include mortgages on only one to four family nonfarm homes, while the 1930 figures are estimates of all residential nonfarm mortgages. At any rate, there was a considerable decrease during this period in the volume of mortgages outstanding. This was due, principally, first, to the lack of new mortgages written since 1930, because residential construction has been at such a comparatively low level in recent years, and, second, to the fact that during the period 1930 to 1937 there was a vast increase in foreclosures, which placed many properties in the hands of the mortgagee.⁶ For instance, real estate owned by life-insurance companies alone increased from \$462,000,000 in 1930 to \$2,096,000,000 in 1937.⁷ Not all, but the greater part of this increase represents residential properties taken over by foreclosure. Thus we have a large block of mortgage money transferred from mortgage to equity from this source alone. Building and loan associations have repossessed another \$1,500,000,000 in residential properties since 1930.⁸

¹ See table B, appendix A, and p. 45 above.

² See p. 46 above.

³ See p. 28 above.

⁴ Based on data covering 52 cities, in David L. Wickens, *Financial Survey of Urban Housing*, Bureau of Foreign and Domestic Commerce, Washington 1937, table III, p. XVIII.

⁵ Oscar L. Altman, *Hearings before the Temporary National Economic Committee, Part II*, pp. 5042, 5043. The revised figure for 1937 is 17.5 (see below).

⁶ Compare detailed explanation by Dr. Altman in the same hearings, Part II, pp. 5043-5046.

⁷ *Real Estate Analyst*, St. Louis, June 23, 1939, vol. 8, p. 131.

⁸ Morton Bodfish, *Hearings before the Temporary National Economic Committee, Part II*, p. 5092.

The principal mortgage lenders on nonfarm one- to four-family dwellings in 1929 are estimated to have been:⁹

	<i>Billions of dollars</i>
Individuals (and others).....	7. 2
Savings and loan associations.....	7. 0
Mutual savings banks.....	3. 2
Commercial banks.....	2. 5
Insurance companies.....	1. 7
Total.....	21. 7

By 1934 a new element had entered, of which more will be said later, namely, the Home Owners' Loan Corporation. By 1937 this corporation had taken over \$2,400,000,000 worth of mortgages. Actually, then nonfarm home mortgages held by private and institutional lenders were reduced from \$21,700,000,000 to \$15,100,000,000 between 1929 and 1937. The greatest single drop in home mortgages held was that of the savings and loan associations, whose total holdings were cut in half, namely, from \$7,000,000,000 to \$3,500,000,000.

The estimated mortgage loans on nonfarm one- to four-family homes in 1937 were:¹⁰

	<i>Billions of dollars</i>
Individuals (and others).....	6. 2
Savings and loan associations.....	3. 5
Mutual savings banks.....	2. 7
Commercial banks.....	1. 4
Insurance companies.....	1. 3
Total.....	15. 1

with \$2,400,000,000 held by the Home Owners' Loan Corporation.

While these figures represent for the most part recorded mortgages, not all of them are first mortgages, particularly those in the group under the heading "individuals." These represent, in large part, second and even third mortgages. Mortgages are in a constant state of liquidation and the figures are constantly changing.

To understand the situation more clearly, let us look at some of the processes of acquiring a home and the methods through which residential construction is brought about. Prior to the advent of governmental activity in the mortgage field, which is to say prior to 1933, practically all States had laws limiting the percentage of loan (to total value) on a single project by institutional lenders within the State. This varied, of course, from State to State, but in the majority of cases represented a limitation amounting to two-thirds of the appraised value of the property. Consider, then, the position of the speculative builder and others who wished to build or acquire individual homes, being able to borrow on the first mortgage only two-thirds of the amount necessary for the acquisition. The cost of the average one-family home in 1929 was around \$7,375,¹¹ which meant that the prospective home owner needed \$2,460, of his own in order to acquire a home. This, of course, placed great limitations upon the available purchasers, restricting the market to the few who might have considerable savings. Actually, however, homes were sold on

⁹ Federal Home Loan Bank Board, Seventh Annual Report (July 1, 1938-June 30, 1939), exhibit II, p. 170.

¹⁰ Ibid. Slight revisions have been made in these figures as compared with those shown in hearings before the Temporary National Economic Committee, Part 9, exhibit No. 626, p. 4094.

¹¹ Average permit valuation of one-family dwellings in 1929 (Bureau of Labor Statistics, Statistics of Building Construction, 1920 to 1937, table A2, p. 8) increased by 50 percent, representing the approximate difference between average permit valuation and selling price. This increase is based on preliminary data from a recent study of 75 cities by the Bureau of Labor Statistics.

as low as a 10-percent down payment even in the 1920's, the difference being taken up by a second mortgage. It was this second mortgage, which represented between 25 and 30 percent of the total cost, that added materially to the interest payments in the monthly cost.

A few records are available to indicate that, in addition to carrying interest rates as high as 10 percent, a substantial commission was necessary to obtain such second-mortgage money. The majority of these mortgages were on a monthly amortizing basis, and failure to meet the regular payments subjected the property to foreclosure in order to wipe out the equity. It was found in some cases that, including the original commissions, fees and interest charges as high as 20 percent were paid.¹² The effective interest rate on all mortgages held by building and loan associations in 1931, for the entire United States, was 8 percent.¹³ However, a number of States showed averages above 10 percent for these associations:¹⁴

	Percent		Percent
West Virginia.....	10.2	Colorado.....	10.5
Alabama.....	12.5	Oklahoma.....	10.2
Tennessee.....	15.3	Oregon.....	10.3
New Mexico.....	11.6	Arizona.....	10.0
Texas.....	10.5		

In many cases, particularly those involving speculative builders and contractors, in order to keep the monthly payment within the range of the possible market the builder himself assumed the second mortgage, which was later discounted wherever possible.

Toward the latter part of the 1920's, when prospects were harder to find, down payments were reduced to as low as 5 percent. The additional mortgages necessary to make up the differences between the down payment and the first mortgage, were taken up by the builder and were later discounted by sometimes as much as 50 percent. This led to the practice of so pricing building as to take account of the possible discount on the second mortgage, in order that the builder could emerge with a profit, and in 1929 and 1930 this practice resulted in a race between the discount rate, which kept climbing higher and higher, and the price placed upon the dwelling unit in order to cover the discount. This vicious circle, by increasing the price, reduced the number of prospects, which made necessary a higher discount for second mortgages, which in turn required an increasing price, ad infinitum.

Another feature of the type of financing prevailing in the 1920's was that first mortgages were term mortgages. Usually first mortgages were written for 3- or 5-year periods, and only the second mortgage was a monthly amortizing one. One exception to this feature was the practice introduced by building and loan associations of monthly amortizing of first mortgages. The term mortgage called for a quarterly interest payment, with a reduction of the loan sometimes required only at renewal periods, at which time a commission for renewal was also charged. The building and loan associations required a monthly interest and principal payment, which, in the majority of cases, covered an amortization period of approximately twelve years.¹⁵ Although the percentage of loan to valuation of property

¹² Department of Commerce, National Bureau of Standards, unpublished report by Robinson Newcomb, entitled "Home Financing in Cleveland," October 1931, pp. 87, 170.

¹³ Federal Home Loan Bank Review, December 1937, vol. 4, p. 76, table 2, p. 80.

¹⁴ *Ibid.*, table 2, p. 80.

¹⁵ Morton Bodfish, testimony and statement hearings before the Temporary National Economic Committee, Part II, pp. 5106, 5487.

for building and loan associations was generally higher than that of other institutions, running from 60 to 75 percent of valuation, nevertheless second mortgages were required, with all of the costly commissions attendant upon them.

In the rental-housing field the system of the 1920's was slightly different but had the same results. Institutional lenders made term mortgages for rental properties on the same basis as for individual homes, and with the same limitations. The second mortgage was also a factor, except that in this field dependence was not placed upon the individual buyer of a home, but upon a capitalization of the prospective income of the property. If it could be shown that rental property could earn a substantial margin above the necessary fixed charges, taking into account the necessary loans, the capitalization of such earnings was considered a fair valuation for appraisal purposes. In the large cities the valuation of such properties was often too large for a single mortgage, and it was divided through bond issues and backed by a trust indenture. Even second mortgages, at one period, were used as security for the issuance of real-estate bonds. While this practice prevailed primarily on commercial and other nonresidential buildings, it also extended to the larger apartment houses. This form of financing was one of the earliest to collapse when the properties on which the bond issues were based were found to lack the anticipated earning capacity.

INTEREST RATES

The various types of lenders may be divided into three classes. First is that type of institution which has for its principal purpose the promotion of savings. This type of institution, which is represented by mutual savings banks and building and loan associations, invests the savings of its depositors or shareholders and returns to them a portion of its earnings in the form of interest or dividends on the accounts. The second type is represented by the insurance companies. Although these companies have certain fixed obligations as to earnings, their earnings are not the important feature in attracting funds. The third type is that class of lender which has neither a legal obligation with respect to earnings nor a competitive situation to meet in obtaining money from the public; that is, the extent to which funds are entrusted to their care is not particularly dependent upon the rate of return. The primary considerations in placing funds in their care are safety and liquidity. This class consists of such lenders as trust companies and commercial banks. Individuals constitute a group closely approximating this third type of lender.

The first class, namely, those who are engaged in attracting money for deposit or investment on the basis of paying a return on such funds, has a different consideration in the matter of the return they must get on their invested funds than have the other two classes. In other words, savings banks and building and loan associations, which are vying with one another as outlets for the general public's savings, must consider the necessity of paying their depositors or shareholders as high a rate of return as possible.¹⁶ The insurance companies, on the other hand, have a more limited obligation, to meet the legal

¹⁶ In answer to questioning, Mr. Bodfish, of the U. S. Building and Loan League, refused to state categorically that the emphasis was placed on the depositor (except to say that there were five or six depositors for every borrower). Hearings before the Temporary National Economic Committee, Part 11, pp. 5088, 5089.

requirements that have been set up to safeguard their insurance funds; therefore, the safety of the loan is the prime consideration.¹⁷

In all cases there are two principal factors entering into interest rates. They are (a) the risk element involved and (b) the cost of doing business. But for the institutions obtaining savings funds there is a third element—the necessity of a return to investors or depositors that will enable such institutions to remain in business. It was claimed by the building and loan associations, through their spokesman, that in the performance of their dual service to investors and home owners, they aim to promote thrift and attract investments as well as to provide economic home ownership.¹⁸ On the other hand, although it might be expected that the savings banks would concur in this, it was admitted by the spokesman for the savings banks that there is a large proportion of people who habitually save if they are employed; that although they hope for the highest interest rates, they are prudent and save regardless of the rate of return.¹⁹ It is to be expected that, competitively, savings funds, particularly in the long run, will be attracted to the outlet where they will obtain the highest return consistent with the degree of safety demanded by the average saver. However, this has not been a problem during the last few years, as witness the growth of savings funds at reduced rates of return and the large amount invested in Government bonds by practically all types of lending institutions.²⁰ Consequently it cannot be said, at least for the time being, that a stated return is necessary to attract funds to any particular type of investment which is equivalent to mortgages.

The element of risk is highly important. Just what part of the interest rate must be set aside to cover risk depends on a number of factors, chief among them being the cost of foreclosure, the loan-to-value ratio, and the amount of losses. Foreclosure costs are determined by the various State laws dealing with that procedure. They may range from an average of more than \$300 (in New York and Illinois) to as low as \$5 (in Texas).²¹ Moreover, some States, particularly since the depression, have enacted moratorium laws; others provide redemption periods between the date of foreclosure and the date of taking complete title by the mortgagee. There are, of course, attorney's fees in all cases. All of these factors add to the cost of taking over the security if the obligations are not met.

It is possible to make a profit on a foreclosed property if the value of the property is greater than the mortgage plus the foreclosure cost. This is not a common occurrence but it indicates the importance of the loan-to-value ratio as a factor in the risk element, a low ratio reducing the risk. Thus, if the loan-to-value ratio is high, it is particularly important that foreclosure costs should be low, in order that both the mortgage and foreclosure costs may be covered if the obligations are not met.

Exactly what the element of risk comes to as a part of the interest rate is found in the testimony of an important insurance executive.

¹⁷ Compare R. R. Rogers, Vice President, Prudential Insurance Co., Hearings before the Temporary National Economic Committee, Part II, pp 5065, 5070, 5071.

¹⁸ Morton Bodfish, testimony, hearings before the Temporary National Economic Committee, Part II, p. 5487.

¹⁹ Henry Bruere, president of Bowery Savings Bank, testimony, hearings before the Temporary National Economic Committee, Part II, p. 5126.

²⁰ Compare John H. Fahey, Chairman, Federal Home Loan Bank Board, statement, hearings before the Temporary National Economic Committee, Part II, pp. 5390, 5391.

²¹ Horace Russell, in Legal Problems in the Housing Field, Housing Monograph Series, No. 2, National Resources Committee, table 1, p. 7.

For the year 1938 this particular company had an actual cost of about one-half of 1 percent for all mortgage losses; that was the difference between the actual gross return to the company per \$100 loaned and the nominal interest charge.²² The function of this difference, as above indicated, is to cover the total risk element in the interest rate. In general the experience of the large insurance company seems to place the risk element at a very low point.

The next element in the interest rate is that of servicing cost; that is, the cost of doing business. It is, of course, necessary to keep accounts, to collect the regular payments, and to look after the mortgage in general. This element is not so easy to evaluate as the risk element. It may well be assumed that the experience of a large concern such as the Prudential Insurance Co. furnishes a good example of the cost of doing business on a large scale. This company's servicing cost for 1938 was reported to be about one-half of 1 percent.²³ In other words, the total of risk element plus cost of doing business on a large scale is only approximately 1 percent. The difference between 1 percent and the nominal interest rate on the mortgage-lending operation represents the return to the company.

However, the cost per \$100 loaned is very different for the smaller type of lender. Just what part overhead represents in the cost of servicing mortgages has not been determined to any extent for all types of lenders. Common sense would indicate that a concern having a relatively small number of loans and operating on a local basis would have a much greater cost per \$100 loaned than would a large concern with a billion or more invested in this type of security, including, perhaps, many mortgages on large structures. Therein lies another essential difference between the typical building-and-loan association and the insurance company.

In 1937 there were 9,662 building-and-loan associations in the country, with average assets of \$591,147 each.²⁴ A lender having only about \$600,000 to invest must of necessity have a greater per-dollar cost in handling small items and spreading losses than would one having several hundred millions. Thus, testimony concerning building-and-loan associations indicates that their servicing cost is 2 percent, as against one-half of 1 percent for a large insurance company.²⁵

There is contradictory evidence as to whether the interest rate offered to the depositor is the prime consideration either in encouraging thrift or in directing the placement of such savings as deposits. For the building and loan associations the testimony indicates that 3 percent is the amount needed by that type of institution to attract funds.²⁶ On the other hand, the testimony concerning mutual savings banks indicates that even at 2 percent more funds are offered than are acceptable to such institutions. In fact it was indicated that if a higher rate were offered depositors of savings banks, true savings would probably not be increased.²⁷ The difference between the two

²² R. R. Rogers, in hearings before the Temporary National Economic Committee, Part 11, pp. 5067, 5068. This measurement is of course based on the entire mortgage portfolio, not merely residential mortgages.

²³ R. R. Rogers, *ibid.*, pp. 5066-5068. Mr. Fahey considers one-half of 1 percent too low a figure to cover overhead costs of servicing, even by a large-scale business (testimony, p. 5398). Probably insurance companies can allocate some of the overhead elsewhere. See M. Bodfish, testimony, p. 5098.

²⁴ Morton Bodfish, *ibid.*, table 1, p. 5496.

²⁵ *Ibid.*, pp. 5098, 5099.

²⁶ *Ibid.*, pp. 5097, 5098.

²⁷ Henry Bruere, *ibid.*, p. 5125.

types of institutions is, of course, that savings banks now offer facilities that attract short-term money.

To sum up, the evidence seems to indicate that the actual percentage returns on funds invested in mortgages under present conditions are as follows: (1) Risk element, one-half of 1 percent; (2) cost of doing business, one-half of 1 percent to 2 percent; (3) return to savers, 2 percent; or a total of from 3 to 4½ percent.

This is in contrast with the rates actually charged. As already noted, the effective interest rate in 1931, for the country as a whole, for one type of lender, namely, the building and loan associations, was 8 percent. Primarily home-owner mortgages are represented in the loans of these associations. Of course, the 8-percent rate reflects the inclusion of fees and commissions as well as some second mortgages. By 1936 the rate, for Federal savings and loan associations only, had been reduced to an average of 6.3 percent.²⁸ However, most of the risk element in a large part of the mortgages is now being taken care of by Federal Housing Administration insurance.²⁹

Interest rates on rental housing have averaged somewhat less than those indicated for individual home owners' loans. In the Borough of Manhattan, N. Y., the rates on mortgage loans, which are principally on rental housing, represent perhaps the lowest in this line, but even here the average rate at the peak of 1929 was 5.95 percent, and in 1936 was down to 4.87 percent.³⁰ These, however, are nominal interest rates and do not represent the effective interest paid, since they take no account of commissions, fees, etc.

Large single loans are generally preferred by large lending institutions and banks and usually carry a lower rate than the single-family home owner's loan, which requires a greater amount of servicing. We have already seen that the servicing cost on single-family loans ranges from one-half of 1 percent to 2 percent, depending upon the type of institution and the total amount of such loans serviced by a single institution.

The effective first-mortgage interest rate on rented property in 1934 (based on data covering 52 cities) was 6.76 percent, and approximately 43 percent of nonfarm rented properties were mortgaged.³¹ However, rental housing is a commercial venture and the return should be calculated on the equity as well as the mortgage, as explained in a previous chapter. If this were done it would be found that the average return on the total investment in rental property is more nearly equivalent to the figure first mentioned, namely, 4.87 percent. Most observers agree that there has hardly ever been a time, except during limited periods of housing shortages, when returns on equity have equaled the rate paid in mortgage interest.

GOVERNMENT LENDING ACTIVITIES

The substantial decline in effective interest rates between 1931 and the present time has been largely the result of various types of Federal intervention. Government activities influencing the return on invest-

²⁸ Federal Home Loan Bank Review, December 1937, vol. 4, table 2, p. 80.

²⁹ F. H. A. mortgages represent approximately 16 percent of the total of building-and-loan association loans. Morton Bodfish, testimony, hearings before the Temporary National Economic Committee, Part 11, p. 5099.

³⁰ Real Estate Analyst, St. Louis, November 26, 1938, vol. 7, p. 1106.

³¹ David L. Wickens, Financial Survey of Urban Housing, Bureau of Foreign and Domestic Commerce, 1937, table III, p. XVIII. The figure (43 percent) would no doubt be higher if it were not for the fact that the sample of 52 cities contained only 1 (Cleveland) with a population over 500,000.

ment in rental housing probably date back to the Housing Act in New York which set up the limited dividend corporation. The New York State housing law was enacted in 1926 and authorized municipal tax exemption (for 20 years) on residential buildings constructed by any corporation which met certain requirements, one of them being that the project should conform to certain physical standards and that the return should be limited to 6 percent of the equity. Up to August 1936 some 14 projects involving 5,896 dwelling units had been constructed under this law.³²

Federal activities began with the setting up of the Federal Home Loan Bank Board in 1932. The Home Loan Bank System as set up in the act of July 22, 1932, provided in effect a central reserve bank whereby home mortgages held by building and loan associations could be used as security for loans to provide them with cash for immediate needs. Advances to member institutions could be made up to 50 percent of the value of the mortgages serving as collateral. Although the purpose of the act was to provide assistance to building and loan associations, membership in the bank system is open to all institutions making long-term loans on urban homes, and as of May 31, 1939, it comprised 3,900 building and loan associations, 9 mutual savings banks, and 40 insurance companies, or a total of 3,949 institutions.³³

Prior to this time the small institutions typical of building and loan associations ordinarily found that borrowing from commercial banks met their cash needs when borrowing had to be resorted to, but with the financial difficulties following the collapse of values in 1929 this source was cut off, and the resulting agitation brought forth the home loan bank system. The system placed no obligations on members except the ordinary requirements of soundness. It made no attempt to influence the interest charges and, according to the Chairman of the Board, "the bank system was unable to contribute in any important way toward relief" of conditions in the home-mortgage field in 1932.³⁴ As a matter of fact, by the time the home loan bank system actually began operations, the wave of foreclosures had engulfed the building industry, and lending on new home building was practically at a standstill. The problem then was not to find money for new construction, but how to stem the rising tide of foreclosures of homes already owned.

The solution to this problem was found in the creation of the Home Owners' Loan Corporation. This Corporation was created by an amendment to the Home Loan Bank Act for the purpose of making direct loans to home owners who were in danger of losing their property through foreclosure.

The essential features of the operation of the Home Owners' Loan Corporation were, first, the issuance of home-loan bonds to holders of mortgages which were subject to foreclosure, in lieu of such mortgages. The indebtedness represented by the mortgages surrendered to the Corporation was then recast in the form of a 15-year amortizing mortgage at an interest rate of 5 percent. This is the first instance in which the home-loan activity of the Federal Government exerted any influence on the interest rate.

³² Report of the State board of housing to the secretary of state of the State of New York, Legislative Document No. 41, 1937. Table LXVII, p. 88.

³³ John H. Fabey, chairman, Federal Home Loan Bank Board, hearings before the Temporary National Economic Committee, Part II, p. 5381.

³⁴ *Ibid.*, p. 5382.

From its creation in 1933 until June 12, 1936, when lending was suspended, the Corporation had made 1,017,948 loans having a principal value of \$3,093,450,641.³⁵ It may be interesting to note here that up to May 31, 1939, 138,640 properties were involved in foreclosures and 52,827 accounts had been paid off in full.

Properties taken over in foreclosure by the Home Owners' Loan Corporation are remodeled and repaired and placed on the market at the going price. Again as of May 31, 1939, total sales numbered 50,665, or over 36 percent of acquired properties. Of these, 39,231 were sold at a loss, the average loss amounting to \$766.52. This, of course, is offset somewhat by the 10,000 or more properties which were sold at a slight gain.³⁶ The method of selling is to place the properties in the hands of local brokers so as not to disrupt the market.

The second step taken by the home loan bank system which influenced construction finance was the setting up of the Federal savings and loan system. This system provided for an investment by the Home Loan Bank Board in such local building and loan associations as wished to come under the Federal system, providing additional capital to these associations. This was simply a means of making public funds available as capital to building and loan associations for the purpose of making home loans and the creation of savings and loan institutions in areas which were not adequately served by private lending institutions. The home loan bank system does not influence the interest rates charged by local institutions through any legal requirements, although in practice representatives of the home loan bank system sit on the boards of Federal savings and loan associations and have a great deal to say regarding their lending policies.

The third factor introduced under the Federal Home Loan Bank System is the Federal Savings and Loan Insurance Corporation. This is an insurance activity designed to insure against loss the accounts of individual investors in such institutions as are members of the Home Loan Bank System. Its functions are similar to those of the Federal Deposit Insurance Corporation for commercial banks in that both insure the funds of the depositor or investor up to \$5,000 each. The principal difference is that the Federal Deposit Insurance Corporation, in the event of the closing of the institution, pays the depositor in cash, while the Federal Savings and Loan Insurance Corporation merely assumes the obligation and may liquidate it over a much longer period.

The activities of the Home Loan Bank System have resulted in providing a safe source of mortgage money for home building. As of August 31, 1939, the Federal Government had \$250,853,000 invested in the savings and loan institutions within the Home Loan Bank System.³⁷ Also, as of August 31, 1939, 2,282,900 investors' accounts were insured in 2,177 savings and loan institutions.³⁸

Consequently, so far as building and loan associations are concerned, the Home Loan Bank System, with its subsidiary organizations, has made an abundance of funds available in all parts of the country. The influence exerted through the Federal Savings and

³⁵ *Ibid.*, p. 5386.

³⁶ *Ibid.*, pp. 5387, 5388.

³⁷ Federal Home Loan Bank Review, October 1939, table 9, p. 30.

³⁸ *Ibid.*, table 7, p. 29.

Loan Associations, together with other factors which we shall describe, had some effect in bringing rates of interest to a point below those prevailing during the twenties. The mortgage lending system is so set up as to prevent a recurrence of the old second-mortgage evils which brought about the high wave of foreclosures during the early days of the depression.

Perhaps the most influential agency affecting interest rates has been the Federal Housing Administration. The F. H. A. was set up by the National Housing Act (1934) under two titles, title I covering the insurance of loans for modernization and repair, and title II providing for insurance of first mortgages on amortized loans up to \$16,000 on terms up to 20 years and amounts up to 80 percent of the appraised value.³⁹ An insurance charge of one-half of 1 percent was made. The act set a maximum of 5 percent (6 percent in special circumstances) on the outstanding obligation as the interest rate on such loans. Subsequent amendments changed some of these terms and also broadened the field of activity. The insurance feature of the F. H. A. was designed to cut the risk involved in lending, thus making more funds available and reducing the risk element in the interest charges.

Loans to cover home mortgages in default are authorized by the provisions of title II (sec. 204). This title provides for issuance of debenture bonds fully Government-guaranteed in all cases where an insured mortgage would be foreclosed. The debenture covers the full amount of the loan outstanding at the time of foreclosure, excluding the cost of foreclosure. Average costs have amounted, as above indicated, to approximately \$300 each. This is the only risk to the mortgagee in an insured loan. This insurance is a factor in the small portion of the interest rate attributable to risk as noted in the above-mentioned analysis of interest rates charged by insurance companies. The debentures run for 3 years beyond the term of the mortgage. This provides sufficient time to liquidate properties taken over by the insurance fund. That the insurance rate of one-half of 1 percent is more than adequate to cover the risk involved under normal conditions is indicated by the report of the F. H. A. for 1938, which shows that of the \$20,051,186 in receipts of mortgage insurance premiums and fees, 1935-38,⁴⁰ only \$160,708 has been lost on defaulted properties.⁴¹

The original operation of the F. H. A. system required an insurance payment of one-half of 1 percent per year on the face value of the mortgage. However, a 1938 amendment to the Housing Act made the insurance premium rate on all loans under title II applicable only to outstanding balances.⁴² This provision was retroactive, i. e., applicable to loans already insured. Undoubtedly even these reduced collections are adequate, under present conditions, to set up a sufficient reserve fund to provide for all eventualities.

The funds derived from the insurance premiums are used to pay the operating expenses of the F. H. A. as well as to maintain a reserve to cover losses. An amendment to the Housing Act in 1938 placed a limit of \$3,000,000,000 (\$2,000,000,000 except with the President's approval) on the aggregate principal obligations of insured mortgages.⁴³

³⁹ 48 Stat. 1246.

⁴⁰ Fifth annual report, statement 14, p. 169.

⁴¹ Ibid, statement 11, p. 168.

⁴² 52 Stat. 8, sec. 3 (amending sec. 203 (c)).

⁴³ The same (amending sec. 203 (a)).

In 1939 it was estimated that \$6,000,000,000 in mortgages was necessary to make the F. H. A. effective in the market in influencing interest rates and terms of home-mortgage financing, as well as to maintain an efficient organization and make the agency self-sustaining on a perpetual basis under both adverse and normal conditions.⁴⁴ Nevertheless the Congress increased the limit only to \$4,000,000,000 (\$3,000,000,000 except with the President's approval).⁴⁵

The insured loan is generally acceptable now to all institutional lenders. However, it is of interest to note that, according to the above figures on the volume of loans on nonfarm one- to four-family homes in 1929 and 1937, individuals (and others) have maintained their relative position as lenders over this period without the benefit of F. H. A. insurance and membership in the Home Loan Bank System, much better than savings and loan associations with such assistance, and much better than commercial banks. For the year 1938 approximately 35 percent of all new one-family nonfarm homes were financed by F. H. A. insured mortgages.⁴⁶

While the original 5½-percent insured loan contributed considerable impetus to home-mortgage lending during the years 1935 and 1936, there was a falling off in such activity in the latter part of 1937 and the early part of 1938. As a result of this, amendments to the Housing Act were passed in 1938 which reduced the minimum down payment on new housing costing not more than \$6,000 from 20 to 10 percent (or, conversely, increased the maximum loan from 80 to 90 percent), and extended the period of amortization on the same loans from 20 years to a maximum of 25 years.⁴⁷ In addition, the insurance premium on the new type of small loans only, was reduced to one-fourth of 1 percent on loans insured prior to July 1, 1939.⁴⁸ Furthermore, the changed basis, noted above, of insurance charges on all title II loans, in accordance with the 1938 amendment, meant a reduction in such charges.

As already shown in the early part of the preceding chapter (see table XI), the change in the amortization period from 20 to 25 years on a \$4,300 loan decreases the monthly payment by more than 9 percent. But more important is the fact that the reduction from a 20 percent to a 10 percent down payment increased the possible market. Obviously, there are more prospects with \$600 in savings (the amount necessary for a 10 percent down payment on a \$6,000 house) than there are with \$1,200 (the amount necessary for a 20 percent down payment).

The effect of the liberalization of the Housing Act by the 1938 amendments may be noted in the fact that for the week ending May 21, 1937, prior to the effectiveness of the new amendments, the total amount of home mortgages accepted for insurance was \$10,618,660, as compared with the week ending May 27, 1939, when mortgages accepted for insurance amounted to \$18,185,800.⁴⁹ This ratio of increase over 1937 has been maintained, on the average, throughout the year 1939.

⁴⁴ Testimony of Dr. Ernest M. Fisher, hearings before the (House) Committee on Banking and Currency, 76th Cong., 1st sess., on H. R. 3232, 1939, pp. 119, 120, 124.

⁴⁵ 53 Stat. 804, sec. 6.

⁴⁶ Of the 97,645 F. H. A. mortgages on new homes in 1938, 97.6 percent were on single-family dwellings (Fifth Annual Report, pp. 66, 100); and about 270,000 1-family houses were built in 1938 (same report, p. 6).

⁴⁷ 52 Stat. 8, sec. 3 (amending sec. 203 (b)). The limitation of the maturity extension to loans insured prior to July 1, 1939, was removed by a 1939 amendment (53 Stat. 804, sec. 7).

⁴⁸ 52 Stat. 8, sec. 3 (amending sec. 203 (c)).

⁴⁹ Federal Housing Administration, Weekly Reports of the Division of Economics and Statistics, Operational Statistics Section, for the weeks ending May 21, 1937, and May 27, 1939.

The largest market, or at least the market where the largest share of the funds for F. H. A.-insured mortgages goes is for homes of a value between \$4,000 and \$6,000 (46.3 percent of the F. H. A. new single-family homes in 1938).⁵⁰ Taking the lower figure, \$4,000, a 10-percent down payment still requires \$400, and it also requires approximately a \$2,000 annual income for monthly payments on a reasonable basis. Consequently, even with the liberalization noted and the resulting expansion of the income-area reached, F. H. A. insured properties are still beyond the reach of about three-fourths of our nonfarm families (table VII). This, however, cannot be laid primarily at the door of the F. H. A., since \$4,000 is perhaps the lowest-priced home that can profitably be produced in the large cities under present conditions and methods, considering the set-up of the industry.

In September 1939 the interest rate on home-mortgage loans was reduced from 5 to 4½ percent. This change, of course, modifies some of the above statements and comparisons to a limited degree. The fact that such a large institutional lender as the Bowery Savings Bank of New York had made F. H. A.-insured loans at an interest rate of 4½-percent and, according to the testimony of its president, considered the business profitable at that figure,⁵¹ may have had some influence in bringing about the reduction.

Although, as indicated in the annual report of the F. H. A. referred to above, the majority of properties which have been covered by F. H. A. insurance cost more than \$4,000, there have been many attempts, especially in small communities, to build houses at a lower cost. In small towns the matter of equipment of the land with municipal facilities is not so important in locating houses, and raw land suitable for habitation is more easily available close to the working centers than is the case in larger cities. On such property houses may be built at a much lower cost than in large cities, even under present methods. Actually a great majority of such houses are supplied by lumber yards which engage in both the sale of materials and the erection of houses. In a great many of these cases the cost of the house alone might easily be below \$2,500. To cover this class of dwellings, title I of the National Housing Act, which was originally designed to provide insurance up to 20 percent of the value of small modernization and repair loans of any authorized institution, was broadened in 1938 to include the financing of new dwellings such as seasonal homes, with a \$2,500 limit on the mortgage.⁵² This class of loans carried only 10 percent insurance, however, and was not attractive to lenders as compared with the more fully insured loans available on homes coming under title II.

In order to facilitate this type of loan the F. H. A. allowed a 6-percent interest rate, with an additional discount of \$2 per \$100 of loan, making the effective interest rate approximately 9 percent. When applied to a \$2,500 loan under title I, this rate made the monthly interest and servicing cost about the same as that of a \$4,000 loan made in 1938 under conditions of title II. Moreover, the amortization period on the title I loan was limited to 7 years.

⁵⁰ Fifth Annual Report, for the year ending December 31, 1938, table 37, p. 101.

⁵¹ Henry Bruere, testimony, hearings before the Temporary National Economic Committee, Part 11, p. 5117. Economies of servicing through volume, presumably in a more or less concentrated area, constituted a factor in making this rate satisfactory.

⁵² 52 Stat. 8, sec. 2.

The effect of these terms and the vast difference between the two types of loans brought about considerable dissatisfaction, on the one hand, from lumber-dealer builders whose biggest market lay in the \$1,500 to \$2,500 class, and, on the other hand, from the wage earner who lacked the necessary savings to make the down payment on a title II home, which would probably cost \$4,000 or more, or in the case of a title I loan would have to meet a monthly cost which, with amortization payments, would be greater than that of a \$4,000 home under title II conditions.

As a result of many complaints on this score, new regulations have recently been issued which provide that title I loans of \$2,500 or less for the erection of new homes may be had under conditions almost equaling those of title II.⁵³ The down payment is only 5 percent. The period of amortization is only 15 years, but the interest (and insurance) charge is represented by either a discount of \$3.50 per \$100 of value each year (which amounts to a rate of 6.7 percent), or a stated rate of 5½ percent, including insurance, provided more stringent conditions concerning the construction are accepted.⁵⁴ Altogether, on a property valued at \$2,500, with a \$2,375 loan and a \$125 down payment, the monthly payment, including the items applicable to financing, amounts to \$19.86. This might be compared with the \$30.78 monthly payment on the \$4,300 loan shown in table XI, which indicates that a loan amounting to slightly less than \$2,000 more involves a monthly payment of only \$11 more. The difference, of course, is due largely to the difference of 10 years in the duration of the payments.

Aside from the activity of the State of New York under its housing act of 1926 providing for limited dividend corporations and tax exemption, the first attempt to encourage rental housing after the depression started was a section of the National Industrial Recovery Act (June 1933) which permitted loans to limited dividend corporations with no provisions for tax exemption. The act provided for loans for low-cost housing without setting up any definition of low cost.⁵⁵ After 1 year's operation only 7 projects had been approved and initiated under this provision of the act, having an approximate total valuation of \$10,000,000,⁵⁶ in spite of the fact that \$100,000,000 is reported by P. W. A. to have been set aside on the expectation that this amount would be used.

To understand the failure of this type of public activity it must be recalled that during the 1920's the principal method of initiation of large-scale rental housing had been through speculation. Promoters had high valuations on land and the amount of mortgage would more than cover all the necessary costs in producing an apartment house, leaving a profit to the promoters. Knowing these facts, those in charge of housing under the National Industrial Recovery Act made particularly rigid rules to avoid promotional profits, and since there was no substantial amount of funds seeking investment in this activity, actual cash equities were scarce. There was little to attract cash equity either as to return or as to safety in the set-up proposed under the N. I. R. A.

⁵³ Federal Housing Administration release 28063, title I home ownership loans.

⁵⁴ Only the 5½-percent loans are eligible for resale to the Reconstruction Finance Corporation.

⁵⁵ 48 Stat. 195, sec. 202.

⁵⁶ Annual Report of the United States Housing Authority for the Fiscal Year 1938, p. 42; appendix VII, p. 58. Does not include Puerto Rico, Virgin Islands, nor loans made on a project involving homes for sale.

Also, the attempt to obtain the lowest rent possible further discouraged those investors who might seek a profit consistent with the risk involved. At that time they found little to attract them in the only feature that was offered under this Act, namely, an interest rate of 5 percent, since the Federal Government could offer no local tax exemptions. The offer was less attractive than even ordinary limited dividend corporation building under the New York State law. It was expected, however, that corporations under the New York law would thus find a source of money and continue operations which had come to a standstill under that law due to the depression. As a matter of fact, more than half of the funds provided under this act did go into the city of New York.

At the same time, unemployment was rife and even at the rents charged by limited dividend corporations in New York City vacancies increased, and for the majority of families even the \$12 per room permitted by the New York State law was higher than many families of the city could afford.

In 1934 when the National Housing Act was passed setting up the Federal Housing Administration a provision was written into the act for insurance of loans to limited-dividend corporations as well as certain public instrumentalities for low-cost housing.⁵⁷ By this time other States had passed laws which permitted limited-dividend corporations to come under State supervision, and it was expected that the insurance features of the Federal Housing Administration would encourage the investment of funds in this type of housing.

While the term "rental housing" was later amended so as to limit the mortgage obligation allocated to dwelling use to \$1,350 per room,⁵⁸ and the rules of valuation were much less rigid than prevailed under the old N. I. R. A., still this type of housing has gone forward at a much slower pace than was originally expected. The insurance of the mortgage, which was limited to 80 percent and averaged 77 percent of valuation,⁵⁹ of course took care of practically all the risk element involved in this type of housing. Yet through the entire period up to the end of 1938 there were only 138 such projects, providing 16,299 dwelling units, on which insured mortgages amounted to \$62,498,150.⁶⁰

The interest rate first set was 5 percent. The limitation on the mortgage of \$1,350 per room has resulted in rents averaging \$14.40 per room per month,⁶¹ or \$57.60 for a 4-room unit. Considering the break-down of incomes shown in table VII, chapter III, this amount is beyond the reach of nearly 90 percent of the nonfarm families. Consequently actual building under this section of the National Housing Act has been competitive with existing private construction, although this activity cannot be called public housing and is purely an aid to private building. Attempts have been made in 1939 to reach a lower income group by reduction of the mortgage interest rate, first from 5 to 4½ percent and then to 4 percent.

An outstanding factor brought out by F. H. A. operations in rental housing is that this activity is not considered a profitable one for the investment of equity funds, although it might become so if a proper attitude were developed among investors. On the other hand, rigid

⁵⁷ 48 Stat. 1246, sec. 207.

⁵⁸ National Housing Act amendments of 1938, 52 Stat. 8, sec. 3 (amending sec. 207 (e)).

⁵⁹ Federal Housing Administration, Fifth Annual Report, for the Year Ending December 31, 1938, p. 122.

⁶⁰ *Ibid*, table 50, p. 120, table 53, p. 127.

⁶¹ *Ibid*, table 57, p. 131.

inspection of construction and aids to proper planning have placed the type of accommodations offered on F. H. A.-insured properties on a higher plane than can usually be obtained in properties costing similar amounts not under the direction of the F. H. A. These facts further indicate that private industry has not reached the point where it can build really low-rent housing to come within the needs of 60 percent of the nonfarm families, in spite of the fact that the risk element in financing is largely eliminated. So far as financing is concerned, the principal reason for this failure on the part of private enterprise appears to be that equity funds usually require a larger margin of profit than is allowed to the limited-dividend corporations, (1) because of the nonliquidity of this form of equity, and (2) because of an errant speculative concept embodied in land trading, particularly when apartment-house construction enters into the picture. Aside from financing, the failure, of course, is due also to the fact that actual physical construction methods and designs have normally prevented the greatest economies possible in such construction.

Another Government agency having to do with large-scale building construction is the subsidiary of the Reconstruction Finance Corporation known as the RFC Mortgage Company. The RFC Mortgage Company was set up purely as a banking agency for the purpose of providing funds for commercial ventures where funds from private sources were unobtainable. Being a banking institution, the RFC Mortgage Company's regulations concerning loans were similar to those of any ordinary banking company. Interest rates were normally 5 percent. It may be said that the total effect of the RFC Mortgage Company's operations was of little practical consequence in encouraging low-cost residential construction.

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CHAPTER VII

LAND, TAXES, AND BUILDING CODES

LAND

One of the most influential elements in housing cost has been the part played by land. Unlike buildings, which depreciate with time and become obsolete with changed conditions, the principle of land values has been that of constant increase paralleling the growth of cities. Lots selling at one time for \$10 have been known to increase to as high as \$120,000 within a period of 60 years.¹ This is no doubt a principal reason for the trend toward apartment houses, since all city lots are potential commercial sites except when restricted by zoning regulations. The historical development of neighborhoods starts with single-family residences which are soon encroached upon by apartment houses and with the infiltration of apartment houses come commercial and industrial developments for the sites.

In more recent years with the development of suburban areas, due to new and more rapid forms of mass transportation, suitable residential sites are no longer confined to the city limits proper, or what were formerly the boundaries of incorporated communities. Since the newer areas are developed through new construction they are not available to the large part of the population that can afford only the monthly payment or rent on second-hand houses, which includes the return on a capitalized value based on the speculative increase in city land values.

On the whole, for new single-family houses, land represents about one-seventh of the value of the property. With an average property valuation of \$5,530 for all new one-family homes on which mortgages were accepted for insurance during 1938 under title II of the National Housing Act, the average land value was \$785, or 14.2 percent, ranging from a high of 16.1 percent (\$1,020) in cities of 500,000 to 1,000,000 in population to 13.1 percent (\$688) in cities of between 2,500 and 5,000.² As already noted, new single-family residences for the most part are being built on the periphery of cities and in suburban areas within metropolitan centers.

On the other hand, for existing single-family homes on which mortgages were accepted for insurance by F. H. A. on refinancing, land values were approximately one-fifth of the property value, or \$1,010 as compared with an average total property valuation of \$5,069. The range for land values on existing homes was from 22.8 percent in cities of 500,000 or more (with an average land valuation of \$1,246 to \$1,310), down to 18.2 percent (land valuation \$851) in cities of 100,000 to 250,000.³

¹ Richard M. Hurd, *Principles of City Land Values*, Record and Guide, New York, 1924, p. 76.

² Federal Housing Administration, *Fifth Annual Report*, for the year ending December 31, 1938, table 47, p. 113.

It may not be fair to state that the difference between the \$785 average land value for new homes and the \$1,010 value for existing homes is due primarily to speculative increase or fictitious value. There may be, and quite likely is, a considerable difference as to what is included in the actual valuation of the land. In suburban areas, streets, sewers, and other municipal facilities are not fully developed and therefore may not be included in the land value, whereas in the older parts of the city such facilities have reached their full development. This means that the difference in value is in some part a matter of the actual cost of providing those facilities.

The elements entering into land cost as a part of residential cost are certainly more than raw land. The difference between raw land which may be used as a base for urban residential property, and fully developed land with complete facilities necessary for fire protection and sanitation, represents an amount which in many instances is considerably greater than the cost of the raw land itself. A study by Robert Whitten and Thomas Adams concludes that the cost of street improvements on the average type of city layout about \$10.46 per front foot.⁴ Their study of a large number of lot costs for typical single-family houses in 24 cities ranging from 50,000 to 1,000,000 in population shows the following results.⁵

Cities of—	Raw land lot cost	Cost of street improve- ments	Improved lot cost	Cost of improve- ments, per front foot
500,000 to 1,000,000	\$457	\$482	\$939	\$12.68
300,000 to 500,000	274	497	771	12.12
100,000 to 300,000	244	402	646	8.74
50,000 to 100,000	233	420	653	9.77
Average for all	299	437	736	9.93

One outstanding feature of street improvement is its uniformity of cost, regardless of the size of the city. As a matter of fact, improvement costs per front foot were greater in cities of 50,000 to 100,000 than in cities of 100,000 to 300,000.

The average land valuation of new properties insured by the F. H. A. in 1938 was \$785, and the average cost of improvements is about \$437 according to the above table; this would make average raw land cost \$348 per lot. It may be assumed that the average size of the lot for the F. H. A.-insured home was the same as that of the lots represented in the above table, namely 40 by 100 feet, or nearly 11 lots to the acre.⁶ Thus the cost per square foot for land utilized in lots (i. e., excluding street areas) would be 8.7 cents. Perhaps 10 cents per square foot would be nearer the average raw-land cost for single-family residences in urban areas. If an equal amount is allowed for improvements and municipal facilities, we would have a land cost of approximately 20 cents per square foot for single-family residences.

It seems to be customary to calculate land cost for apartment-house construction on a per-foot basis also. However, since municipal improvements cost about the same per front foot whether for construc-

⁴ *Neighborhoods of Small Homes*, Harvard University Press, Cambridge, 1931, p. 76.

⁵ *Ibid.*, pp. 152, 153.

⁶ With street areas taken off this usually is reduced to 8 lots to the acre, making the cost of an average acre of raw land \$2,784.

tion of an apartment house or a single-family residence, there should be some savings in the ratio of land cost to the total cost of construction of an apartment house. On the contrary, as will be illustrated below, the average land valuations in apartment house areas are actually about as high on a per-dwelling-unit basis as those of single-family residences, and hence much higher on a per-foot basis. This indicates that even with the construction of apartment houses away from the center of cities, the increment of increased land values is carried with them when such areas are turned into apartment-house areas.

While figures on land cost for apartment-house construction are not so readily available as for single-family residences, a few such projects which are under public regulation have been analyzed, as shown in table XVI. By a curious coincidence the average land cost per dwelling unit for the 14 limited-dividend projects in New York City is just \$1 more than the average land valuation of existing single-family homes on which mortgages were insured in 1938 by the F. H. A. (\$1,011 as compared with \$1,010), this in spite of the fact that the cost of the New York land per square foot ranged from a low of 50 cents to as much as \$18. Thus the land cost per dwelling unit for apartment houses is about equal, apparently to that of single-family dwellings in spite of the increase in number of families per given plot of ground. This is due to the fact that such valuations are based on capitalized income, the difference between such valuation and the actual cost, representing an increment in land value. On the newer multifamily properties shown in the last three items of table XVI, the average land cost was only \$608 a unit, but this is explained by the fact that all three of these properties are suburban and required the construction of some or all public facilities.

TABLE XVI.—*Land costs on multifamily residential construction*

	Number of dwelling units	Land cost	Land cost per unit
14 NEW YORK CITY LIMITED-DIVIDEND PROJECTS			
Academy Housing.....	476	¹ \$196,000	\$412
Amalgamated Dwellings.....	232	336,560	1,450
Amalgamated Housing:			
First 6 units.....	308	300,000	974
Units 7 and 8.....	202	195,560	968
Unit 9.....	115	80,060	696
Boulevard Gardens.....	958	¹ 550,200	1 574
Brooklyn Garden:			
Fourth Avenue.....	165	100,994	612
Navy Yard.....	140	90,047	643
Farband Housing.....	129	82,500	640
Hillside Housing.....	1,405	¹ 447,874	¹ 319
Knickerbocker Village.....	1,585	² 3,247,090	2,049
Manhattan Housing.....	44	58,250	1,324
Stanton Homes.....	44	² 100,000	² 2,273
Stuyvesant Housing.....	93	² 186,024	² 1,936
Total.....	5,896	5,964,949	1,011
3 F. H. A. PROJECTS			
Brentwood Village, Washington, D. C.....	426	230,418	541
Falkland Properties, Silver Spring, Md.....	178	166,320	934
Elm Terrace, York, Pa.....	43	14,946	348

¹ Unimproved land.² Slum-district sites.

Source: First 14 projects from 1937 Report of the New York State Board of Housing (pp. 58, 59); last 3 projects computed from table IX, chapter V.

The fact that municipal facilities represent approximately one-half the land values on single-family homes indicates that the provision of these utilities may be quite a factor in obtaining low-cost residential construction. Prior to the present depression improvements were paid for by assessment against the abutting properties on a front-foot basis. More recently, however, with the advent of the P. W. A. and the W. P. A., such improvements have been made at no cost to abutting property owners, although there is no evidence that such property owners have failed to take advantage of the increment in value thus acquired, for example, in setting rents.

Not all of our new dwelling construction, as already shown, is built on improved sites. A considerable part is built on raw land lacking city facilities. Water and sewerage are provided by drilled wells and septic tanks, although the cost of an individual water supply may be equal to the lot owner's share of the public water supply without the advantages of the safeguards usually provided in public water supply. On the outskirts of many of our smaller cities, and even of metropolitan areas, the lowest cost housing is being built on raw acreage, subdivided but without provisions for adequate facilities.

The common practice is for a promoter to purchase raw land and subdivide the area into acre, half-acre, or quarter-acre plots. Many of these are sold on the basis of \$5 down and \$5 a month. A worker may make a \$5 down payment for a plot, move onto it and start building immediately. Since such areas are usually outside the jurisdiction of the municipal government there are no zoning or building regulations and the purchaser may put up any sort of shelter he desires. Purchasers often move onto the land in trailers, tents, or other temporary shelters, and build their houses in their spare time.⁷ Eventually the areas become incorporated into the city, and when improvements come along and municipal facilities are built the land values are increased in accordance with the cost of such improvements. In time, as the area becomes crowded, apartment houses are built and new unimproved sites are developed. The periphery is moved farther and farther from the center of the city, commercial developments move toward the outskirts, and as commercial developments enter and residential structures deteriorate, the value of the neighborhood as a residential area declines. As the dwellings depreciate in value and commercial elements such as gas stations and retail stores enter the area, the neighborhood becomes obsolescent. With its obsolescence as a residential neighborhood, various means are used to maintain an income on the high valuation of the land. In spite of neighborhood obsolescence and building depreciation, real-estate owners seldom depreciate the value of the land. It is the attempt to maintain the former income on this high valuation that causes more and more crowding and eventually brings about slums.

City planners have studied this problem and have come to the conclusion that instead of haphazard developments in city building, such as those described above, it is better to have planned neighborhood units controlled through city regulation and intelligent ownership so that such obsolescence can be prevented. For instance, the gridiron pattern of the average city subdivision layout is more expensive, when it comes to the cost of constructing necessary city facilities, than almost any other type of layout that could be designed.

⁷ See Archer's Suburban Life, a brochure distributed by the Archer Development Co., Houston, Tex., 1939. This brochure gives case histories of the development of the company's sites.

Whitten and Adams show that, as compared with \$11.92 per front foot for the usual street improvements on the gridiron pattern, the same facilities may be had at a cost of \$7.85 on a hexagonal pattern of a size large enough to make the neighborhood a self-contained unit, or at a cost of \$8.02 per front foot on the cul-de-sac pattern of the Radburn Village type.⁸ Similar savings in the cost of municipal facilities are available for water and sewerage lines as a whole if the pattern of the layout is taken into consideration.

By far the most important factor in preserving the neighborhood scheme and preventing obsolescence, which brings with it the tendency toward crowding and slums, is an initial neighborhood unit under a single control and large enough to prevent (1) the encroachment of nonresidential elements (which destroy the desirability of the section as a residential neighborhood), and (2) an undue speculative increase in the real-estate value. In small towns, of course, this factor is not so important, since plenty of space is available and there is not the tendency to add a speculative increase to the land value.

TAXES

Local taxes are an important element in the monthly cost to the consumer. More than 60 percent of the average municipality's revenue in 1928 came from real-estate taxes.⁹ Real-estate taxes are based on a fixed rate applied to assessed valuation. In amount this tax ranges from 20 to 30 percent of the rental dollar where there has been no tax exemption. For New York City, which has a rate of approximately .3 percent on a 100-percent valuation assessment, the tax averaged 21.6 percent of the rental dollar for 39 apartment buildings in 1937.¹⁰ The North Carolina Tax Commission reported, for 1928, that 34.5 percent of net rent on 584 urban residential properties was taken in taxes.¹¹ In general, tax rates on real estate range from 1½ percent to as high as 10 percent of the assessed value. This includes State and county taxes in a great many cases.¹² The rate in itself is inconclusive, depending upon the assessment practices of each municipality.

However, it appears to be generally true that nearly one-quarter of the rental dollar may go to taxes.

The Administrator of the United States Housing Authority, in estimating the local contributions (equivalent to tax remissions) to the subsidy on U. S. H. A. projects, arrived at 16½ percent as the average portion of the economic rent that local real-estate taxes would represent.¹³ State taxes would perhaps increase this percentage. This portion of the rental dollar is in payment for the facilities and services which the city must provide. Streets must be maintained, and education, police, and fire protection must be provided.

Although information is not available from many sources, two studies on the subject have indicated that even this high percentage of the monthly rental dollar is insufficient to pay for all the services provided by the municipality. In a study of the city of Boston, it

⁸ Neighborhood of Small Homes, table VI, p. 26.

⁹ The President's Conference on Home Building and Home Ownership, Home Finance, and Taxation Washington, 1932, p. 103.

¹⁰ Table B, appendix A.

¹¹ Home Finance and Taxation, pp. 104, 105.

¹² Compare the same, p. 104. This report estimates that the general average rate was in excess of 3 percent in 1931.

¹³ Nathan Straus, hearings before the Temporary National Economic Committee, Part II, pp. 5416, 5420.

was found that 78 percent of the total acreage failed to pay in taxes of all forms the amount that the services provided cost the city.¹⁴ A similar study was made by Howard Whipple Green of one slum area in Cleveland, Ohio, where it was found that it cost the city \$1,250,000 to pay for the services provided in that area, while only \$250,000 was collected in taxes from the same area.¹⁵ In the city of Boston the costs and income by types of areas—business, industrial, and residential—are shown in the following table:

*Percentage of cost and income of the city of Boston by eight groups*¹

[The tax-exempt tracts have been combined with the unclassified tracts]

	Cost	Percent of cost	Income	Percent of income
Business.....	\$8,765,121	13.50	\$20,170,689	30.98
Industry.....	5,967,908	9.19	5,399,727	8.29
High-rent residential.....	1,709,466	2.63	3,915,191	6.01
Miscellaneous residential.....	5,268,294	8.12	7,541,720	11.58
Suburban residential.....	10,999,656	16.94	8,196,541	12.59
3-decker residential.....	14,474,326	22.30	7,652,774	11.76
Low-rent residential.....	5,704,824	8.79	2,370,742	3.64
Not classified (including tax-exempt).....	12,027,759	18.53	9,853,265	15.15
Total.....	64,917,354	100.00	65,100,649	100.00

¹ See text footnote 16.

NOTE.—The tax abatements on real estate and personal property of \$487,988.42 were not deducted from the "Income" scheduled above.

The report from which the above table was taken indicates that both on a per-capita and on a per-acre basis the highest costs in proportion to tax-income, and therefore, the largest deficits, were incurred in the low- and medium-rental areas.¹⁶ One important factor of municipal services is the cost of educational facilities. It is the educational item in most budgets which presents the greatest problem to municipal governments. Obviously, to reduce the amount of taxes assessed it is necessary either to reduce the cost of the services provided or to reduce the services themselves. It seems, further, that it is highly impracticable for municipal officials to advocate reduction in the services provided. On the contrary, the tendency seems to be to increase the services.

As a matter of fact, with the depression came added obligations for municipalities in the form of relief requirements. Much of the revenue formerly going to public works, such as street repair, extensions and repairs of sewers and waterworks, etc., has been replaced by grants from the W. P. A. and the P. W. A. Probably the grants-in-aid for public works have about balanced the extra obligations caused by local relief needs. As recovery continues and local relief needs diminish, most municipalities will be in a better financial position to reduce local taxes, provided the grants-in-aid for public works continue. If, however, such grants-in-aid do not continue and the obligation for public works must be resumed once more by the municipalities, one obligation will merely be substituted for another. As a consequence it appears that the only possibility of reducing the tax

¹⁴ William S. Parker, hearings before the Temporary National Economic Committee, Part 11, p. 5242.

¹⁵ City Planning Board, Report on the Income and Cost Survey of the City of Boston, 1935, p. 8.

¹⁶ Report on the Income and Cost Survey of the City of Boston, 1935, p. 6. This report was introduced into the record of the Temporary National Economic Committee Hearings, Part 11, p. 5245; see Mr. Parker's explanation of it, pp. 5242-5244.

element in the rental or home-ownership cost lies in some form of grants from the Federal Government or in shifting part of the tax from real estate to some other form of revenue.

The form of taxation represented by real estate taxes is in itself highly conducive to maintaining speculative land values, because of the fixed assessed valuations which are seldom revised downward. These valuations create a tendency to attempt to earn a return on such capital values. This causes crowding and brings into residential districts factors which tend to depreciate residential real-estate values, thus starting neighborhood obsolescence.

There is a factor of cost which ultimately may increase without compensating benefit the real-estate taxes assessed: that is, the cost of the physical improvements in city development. As already shown, most cities grow haphazardly outward from their centers, which brings an extension of municipal facilities in many cases far beyond the immediate needs of the city. Some savings are possible by more scientific planning and laying out of the additions to cities. This is now recognized in many of the newer projects under both the F. H. A. and the U. S. H. A.¹⁷ While this will be of aid through lower taxation of new housing developments, it does not help in solving the problem of obtaining lower housing costs in existing municipalities, but merely indicates that, if any saving in the element of monthly rent attributable to taxes is to be had, it probably must come through projects built in areas outside the boundaries of present municipalities. This solution, however, is difficult for existing cities and makes their taxation problem more acute.

BUILDING CODES

Much criticism has been voiced from time to time concerning the effects of building codes and zoning regulations on the cost of construction. It is claimed by some that a considerable part of the excess cost is due to code regulation, and that the failure to keep abreast of scientific developments by changes in building codes prevents the possibility of lower-cost construction.¹⁸ Building codes are primarily regulations designed to safeguard inhabitants of a given area from dangers to health which may be caused by improper sanitary measures in building, and from fire hazards caused by the crowding of non-fireproof construction. Also, it is assumed that every building must be strong enough to withstand the stresses and strains occasioned by the uses to which it is put, and that it is the duty of the local officials to see that no dangers arise from failure to provide sufficient strength to withstand such stresses and strains.

Since building is a complex operation and new information concerning the scientific properties of building materials is being acquired nearly every day, it may be seen that a fixed set of provisions over a period of time tends to prevent the adoption of new materials and processes which may be more economical and yet may provide all the necessary safeguards intended to be achieved by the code. In most instances the authorities have realized this situation and have made provisions which leave considerable discretion to building inspectors

¹⁷ An example of obtaining the lowest maintenance cost as well as initial cost in municipal facilities is shown in the laying out and planning of Greenbelt and Greendale developments by the Resettlement Administration. See Frederick Rigger, "Site Planning", in Housing Monograph Series, No. 3, National Resources Committee, 1939, pp. 19-39.

¹⁸ Compare Robert L. Davison, Hearings before the Temporary National Economic Committee, Part H, pp. 5327-5334-5336.

and local officials. It is through these discretionary provisions that many abuses have arisen. Consequently, any failure to take advantage of scientific improvements in most cases can be charged to unintelligent administration of obsolete codes rather than to specific provisions.¹⁹

For example, the majority of building codes provide that any material may be used if satisfactory evidence is presented to the proper officials that the material will accomplish its purpose in a satisfactory manner.²⁰ This, it would seem, is sufficient to permit the use of any new scientific development if it is demonstrated and proven to be a satisfactory material for its purpose. In actual operation, however, it is necessary for the proponent of the new method or material to conduct a test before the designated officials, which, to begin with, is very expensive. This would not be prohibitive if a single test were sufficient to make the material acceptable for all future construction. Many officials, however, have abused this clause by requiring an expensive test each time the material is to be used. Under such circumstances it is much cheaper to use the old method than to introduce the new material.

Another deficiency in most building codes is that the requirements are based on methods applicable to materials known at the time the code was written, at which time such provisions were considered fair and adequate. But with the development of new designs and new types of materials these requirements work a hardship. As an example, the building code for Washington, D. C., and a good many other cities for that matter, provides that the minimum thickness of walls for dwellings shall be 8 inches, and where the building is three stories high the lowest floor must be 12 inches thick, etc. These dimensions are reasonable when one considers their application to ordinary materials of construction, such as lumber and masonry. However, the provisions are certainly uneconomic when applied to steel and glass. As a consequence, for instance, a prefabricated steel building could not be erected in the city of Washington or any other city having such a code provision; nor could a fireproofed plywood-panel construction meet such requirements, in spite of the fact that either of the above constructions has sufficient strength to meet all stress requirements.

In plumbing codes the situation is even worse. New knowledge is being gained daily as to the action of drainage and methods of carrying off drainage. Practically all recent tests have indicated that our plumbing requirements are far beyond those actually necessary for the proper safeguarding of health. On the other hand, those engaged in the plumbing business resist any attempt to decrease these requirements if it means a reduction in the amount of materials or labor. Plumbing interests have a powerful weapon in the form of publicity that might indicate danger to the public health, and therefore any acceptance of change in plumbing requirements has been very slow.

Another factor in building codes that adds cost is the diversity of requirements in different cities, which in effect means that the manu-

¹⁹ A report by an investigating committee in Cleveland, Ohio (Home Building Conditions in Cleveland by George B. Buckley, manager of the construction industries department, Cleveland Chamber of Commerce, September 1938, p. 9) states that "The home building industry is not penalized by the requirements of the local code largely because of sympathetic enforcement by the Cleveland Commissioner of Buildings." The point here is that although the code is restrictive the fact that it has not operated restrictively is due entirely to the discretion of a single official.

²⁰ Robert L. Davison, hearings before the Temporary National Economic Committee, Part 11, p. 5336.

facturer of materials must meet the code provision calling for the highest standard in order to be sure that he meets all standards. This has long been realized as an important deterrent to progress in the reduction of cost and is partially being met by movements to write uniform standards in building codes. The greatest success has been achieved by the building-code officials of the Pacific coast in their design of a Uniform Building Code which has been adopted by more than 100 cities.²¹

It has been recommended, and it seems entirely logical, that building codes should be written in terms of requirements consisting of basic principles only, in terms of accomplishment rather than in terms of specification, and that methods and materials should be illustrative only. The danger in this type of provision is that it leaves maximum discretion to individuals, and is particularly subject to faulty administration, which is the source of many present-day abuses. The fact that there is continued exertion of pressure by various material interests, subcontractor groups and labor unions, which maintains uneconomic provisions, indicates that such pressure would also be exerted on officials with discretionary powers.

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²¹ Letter from Pacific Coast Building Officials' Conference.

CHAPTER VIII

TECHNICAL TRENDS

ECONOMY OF DESIGN

While the influence of labor and materials on building costs has come in for a large share of public consideration, too little attention has been paid to the influence of design on costs. The architectural profession, within whose province all design considerations lie, has regarded the field of low-cost housing an incidental one and certainly not a profitable one. This may be due to the type of architectural training that has been prevalent, patterned after the Beaux Arts system, which lays greater stress on monumentalism than on economy.¹ Where architecture has played a part in housing it has been in the interest primarily of appearance and esthetics.

The result of the architect's neglect of the low-cost field has been a notable lack of progress in both the method of production and the article produced. Whatever progress has come about has been chiefly the result of commercial developments by materials producers. However, developments of building materials manufacturers cannot take the place of proper location of rooms and facilities of the house so as to obtain a maximum of comfort and convenience at the lowest cost.

One of the important features of economy in design is the standardization of space arrangement. The National Small Homes Demonstration Committee has made a start in this direction. This committee is composed of representatives of leading manufacturers and others under the sponsorship of the National Lumber Manufacturers Association. Its stated purpose, according to its letterhead, is "to foster improved design and to promote local demonstration of economy in building and financing of small low-cost homes." After consideration of the various types of heating systems, bathroom fixtures, and kitchen facilities, a standard size for bathrooms, kitchens, and utility spaces was recommended for the design of homes costing \$3,000 or less.² The principal effect will be the influence on manufacturers of equipment to standardize their over-all dimensions to fit such spaces. The committee also promulgated a series of room arrangements so that the greatest economy in partitions, piping, and other materials might be obtained. The fact that a committee of manufacturers has taken the initiative in finding economies through design indicates the possibilities in that field and emphasizes the neglect by the architectural profession.

That there are many other possibilities in the field of standardization is indicated by the great variety in size and design of doors and window openings, as described in chapter V, under "Materials." It is not necessary to eliminate entirely the possibility of obtaining variety

¹ Charles H. Lench, *The Promotion of Commercial Buildings*, Architectural Economics Press, 1932, p. 43.

² Compare Robert L. Davison, hearings before the Temporary National Economic Committee, Part 11, pp. 5318-5320.

in appearance through inequality in fenestration. The small variations in sizes of window openings between one district and another, as shown in table XVII, add nothing to appearance, yet are responsible for the failure to bring millwork costs down to reasonable levels despite the fact that doors and windows, with their frames, constitute a field for mass production methods.

TABLE XVII.—Allowances to be added to glass size ordered for finished window openings

[Inches]

City	Lay-out					
	1½ and 1¾ 2 light windows		1½ and 1¾ 4 light windows		1½ and 1¾ 8 light windows	
	Width	Length	Width	Length	Width	Length
Boston.....	3½	5	3½	5	4½	5
New York.....	4	6	4	6	4	6
Western.....	4	6	5	6	5	6
Ohio.....	4½	6½	4½	6½	4½	6½
Washington.....	4½	6½	4½	6½	4½	6½
Baltimore.....	4½	6½	4½	6½	4½	6½
Philadelphia.....	4½	6½	4½	6½	4½	6½
Indianapolis.....	5	6½	5	6	5	6
Wilkes-Barre.....	5	6	5	6	5	6
Southern.....	5	6	5	6	5	6

City	Lay-out					
	1½ and 1¾ 12 light windows		1½ 8 light windows		1½ 12 light windows	
	Width	Length	Width	Length	Width	Length
Boston.....	3½	5	4½	5	3½	5
New York.....	4	6	4	6	4	6
Western.....	4½	6	4½	6	4	6
Ohio.....	4½	6½	4½	6½	4½	6½
Washington.....	4½	6½	4½	6½	4½	6½
Baltimore.....	4½	6½	4½	6½	4½	6½
Philadelphia.....	4½	6½	4½	6½	4½	6½
Indianapolis.....	4½	6	4½	6	4	6
Wilkes-Barre.....					5	6
Southern.....					5	6

Source: National Door Manufacturers Association, Chicago.

An important factor in economy of design is elimination of the many items classed as "gadgets." Usually this term is applied to elements which are momentary fads and fancies and may be classed as ornamentation but add little or nothing to livability. It has been shown that builders make double the profit on extras that they make on the basic elements of the house.³

The United States Housing Authority has been forced by necessity to make some studies in design in order to obtain the lowest possible costs. Among the economies developed so far are the following:⁴

(a) Utilize straight walls with unbroken lines.

(b) Design utilities in a straight line to eliminate bends in the plumbing as far as possible.

³ Robert L. Davison, hearings before the Temporary National Economic Committee, Part 11, p. 4988.

⁴ Nathan Straus, hearings before the Temporary National Economic Committee, Part 11, p. 5430. Also see U. S. Housing Authority, Policy and Procedure Bulletin No. 12, Dwelling Unit Planning, pp. 7-13.

(c) Provide the greatest possible flexibility in rooms so that they may be conveniently used for multiple or substitute purposes.

(d) Provide dining space in kitchen, which makes possible the elimination of dining room.

(e) Utilize dimensions that stock sizes will fit.

(f) Avoid hilly or broken sites, but if such sites are necessary, design buildings so that the length runs parallel to contours and not across them.

(g) Place equipment against inside or partition walls rather than outside walls. This allows the attachment of equipment for two rooms to the same service line.

These are but a few of the methods by which the designer may contribute economies equal to, if not exceeding, the possibilities of reductions in wage rates and material prices. A full list of such possibilities would run to more than a hundred items.

RESEARCH IN DESIGN AND MATERIALS

Some studies have been made, particularly since the depression, to determine the savings that can be achieved by simplification and standardization of design. Many manufacturers, as well as their associations, have conducted researches looking to a wider and more profitable use of their particular materials. The work of the American Concrete Institute in concrete construction, of the Forest Products Laboratory in lumber and new uses of wood, and of many others has contributed to the making of better products used in the construction of houses; but it must be emphasized that very few agencies have tackled a thorough study of all elements entering into the production of homes at a cost which can be met by the majority of urban families.

One of the private agencies engaged in research on a broad scale was Bemis Industries, Inc., whose work in housing started in 1923 in Massachusetts.⁵ The Bemis research experimented with different materials and combinations of materials with the objective of finding a low-cost house that could be produced at a profit. The purpose was to develop construction schemes and principles rather than a single plan or building material. The research activities of Bemis Industries have now been transferred to the Albert Farwell Bemis Foundation of the Massachusetts Institute of Technology. Although a number of experimental houses were built by Bemis Industries, Inc., its most noted contribution is the use of the module in design. This is merely a step toward standardization of dimension, principally by using multiples of 4 inches or 4 feet in all dimensions.

The module has been put to practical use as a basis for a system of semiprefabricated construction by the Homasote Co., of Trenton, N. J., in their "precision built homes."⁶ The Homasote Co. equips local lumber dealers with the proper gigs, tables, design systems, and methods of operation, to enable the dealers to precut many parts of a house built with regular materials, including Homasote for insulation. The prefabrication consists of complete wall and floor sections which are erected in the field but, being designed on the modular plan, are applicable to any ordinary type of single-family residence built of wood frame, brick veneer, or stucco.

⁵ John Burchard 2d, "Research Findings of Bemis Industries, Inc.," *Architectural Record*, January 1934, vol. 75, pp. 3-8.

⁶ F. Vaux Wilson, Jr., *Tomorrow's Homes*, published by the Homasote Co., Trenton, 1939. See also R. L. Davison, *hearings before the Temporary National Economic Committee*, Part 11, p. 5337.

Another private research activity is that of the John B. Pierce Foundation of New York. This foundation has as its primary objective research in the field of heating, ventilation, and house comfort.⁷ The Pierce Foundation does not publicize its findings and therefore little is known of its actual accomplishments. Some work has been done on the physiological and psychological effects of heating and ventilating systems, but the findings of this research are not as yet sufficiently conclusive to justify any change in heating systems. The Pierce Foundation has made some studies in the economies of low-cost housing and has made numerous contributions in this field.

Manufacturing companies have made useful studies which were primarily designed to increase the companies' activities in their particular fields, such as the research of General Electric and Westinghouse Electric & Manufacturing Cos., and that of building material manufacturers such as Johns-Manville Corporation. Some years ago the A. O. Smith Co., of Milwaukee, conducted studies of the possibility of a prefabricated house market. This work started in 1930 but the results were not published and the company never followed up with any activities in the housing field. It is presumed that their studies indicated that conditions were such, considering the market, that a prefabricated house was impracticable at that time.⁸

Public research activities in the housing field are comparatively recent. The National Bureau of Standards, of the Department of Commerce, has been engaged in testing materials over a considerable period of time. It makes determinations as to the qualities of various materials. While such a function is very important in any research activity in low-cost housing, the essential need is more than mere measuring and testing. This was recognized in 1937 when an appropriation was made at the instigation of the Central Housing Committee to "study the properties and suitability of building materials, with particular reference to their use in low-cost housing, including the construction of such experimental structures as may be necessary for this purpose, provided that no part of this program shall duplicate any work now being performed by the Forest Products Laboratory of the Department of Agriculture."⁹ The appropriation for this purpose was \$198,000 with additional appropriations of a similar amount for the fiscal years 1939 and 1940.

With the first appropriation the Advisory Committee of the Bureau set up a series of maximum costs for the types of constructions and materials to be tested under this program. These costs are shown in table XVIII.

TABLE XVIII.—*Maximum cost of construction for samples submitted for testing in National Bureau of Standards Research program*

[Costs as of July 1937 in Washington, D. C.]

Element:	Maximum cost per square foot
Bearing walls	\$0. 60
Partitions and nonbearing walls .....	. 35
Floors, structural, finish, and ceiling below .....	. 75
Roof, structural, covering above, and ceiling below .....	. 60

⁷ P. L. Davison, hearings before the Temporary National Economic Committee, Part II, p. 4976.

⁸ Peter A. Stone, "Experiments with Low-cost Homes," General Building Contractor, April 1932, vol. 3, No. 4, p. 24.

⁹ Letter Circular LC-502 of the National Bureau of Standards, July 30, 1937.

TABLE XVIII.—*Maximum cost of construction for samples submitted for testing in National Bureau of Standards Research program—Continued*

[Costs as of July 1937 in Washington, D. C.]

Element:	Maximum cost per family of 4
Heating plant.....	\$400
Lighting.....	180
Kitchen equipment, including plumbing, refrigeration, and storage equipment.....	320
Bathroom equipment, including special finish walls and floor, plumbing and fixtures.....	400

Source: Research Program on Building Materials and Structures, 1937-38 (LC-502), National Bureau of Standards, July 30, 1937, p. 5.

From this table it may be seen that the limiting costs are approximately the costs of present-day ordinary construction. Manufacturers may submit samples of materials and constructions that come within the cost limits noted. These materials and units are put to a number of tests designed to measure their strength and durability under varying conditions. Some 22 types of walls, floors, boards, and construction systems have been tested, and the outstanding feature common to them all is that they approach the maximum costs in the table and show no tendency toward the development of lower cost materials. Further, the tests have shown that in practically all cases there is vastly more strength built into the construction systems than is necessary for actual use.¹⁰

The Forest Products Laboratory of the Department of Agriculture has been in existence for a good many years. Designed principally to conduct studies in lumber and timber products with a view to improving the processes of manufacturing such products, the laboratory has done notable work in discovering methods of producing and fabricating better lumber and lumber products. When the program for research in low-cost housing was promulgated by the Central Housing Committee, the Forest Products Laboratory undertook a number of studies contributing to this research, among them being studies of glues and methods of gluing plywood, methods of panel construction, and standardization of millwork sizes.

Another public agency making studies of housing which, by necessity, must be low in cost, is the Bureau of Agricultural Engineering of the Department of Agriculture. This agency, as its name implies, studies farm construction and has made tests calculated to show the most essential factors of farmhouse design. These tests include methods of ventilation, painting, room arrangement, etc.

An important field for much needed research is determination of minimum actual strength or other quality needed to meet the requirements of livability. As an example, the building code of the city of Washington requires a ceiling height of 8 feet for residential buildings; the old Housing Division of the Public Works Administration in its housing standards fixed a minimum ceiling height of 8 feet 6 inches;¹¹ the United States Housing Authority set a minimum height of 7 feet 10 inches.¹² In none of these cases was the story height based on any scientific determination of need or on any fundamental physical fact;

¹⁰ See Building Materials and Structures Reports 1-24, National Bureau of Standards, June 1936-August, 1939.

¹¹ Unit Plans, May 1935, p. 7.

¹² Policy and Procedure Bulletin No. 12, Dwelling Unit Planning, p. 9.

it was based merely on the individual ideas of the writer of the provisions. The variations in the requirements for strength of building sections according to different codes, certainly indicates the need of some scientific facts as to the actual strength required to meet the needs of ordinary living conditions, with of course an adequate factor of safety.

PREFABRICATION

Perhaps the question most often asked by the average layman is why mass production has not been applied to the housing field in order to bring down cost as it has been in automobiles, tractors, and other products. Actually a large number of the parts entering into a house are prefabricated on a mass production basis—doors and windows (where stock sizes are used and glazing is allowed off the job), furnaces, lighting fixtures, etc. For a number of years attempts have been made to increase the amount of prefabrication in order to reduce the volume of field assemblage.

Various forms of resistance have been met such as lack of acceptance by the building public, lack of cooperation on the part of labor, which fears loss of work through prefabrication, inflexible requirements of building codes, as well as the tendency on the part of many large manufacturers already entrenched in the field to promote their established products in order to protect their investment; hence little progress has been made in the last 10 years.

Some of the earliest efforts along this line were attempts to popularize precut houses; that is, all lumber and parts were precut, to be fitted on the job, as exemplified by the Sears Roebuck precut houses. Although this company sold a large number of houses, the evidence indicates that very little saving resulted from this method.

During the depression, steel companies, in their endeavor to find a new market, also turned to this industry; but here again, no appreciable result could be obtained in reducing the cost below that of houses built by ordinary site assembly. Altogether there have been perhaps 50 efforts to produce a prefabricated house, none of which, apparently, has been successful in producing the saving that one has come to expect from mass production, the principal reason, of course, being that in none of these efforts has mass production actually been accomplished. Mass production implies a mass market. A mass market cannot be obtained until the cost has been reduced considerably, and the cost cannot be reduced very much until mass production on a prefabricated basis has been accomplished. Thus we have a vicious circle which has produced a stalemate.

Those companies which are still in business in the production of prefabricated houses, using more or less traditional materials, have been able to accomplish economies, so far, of about 10 percent as compared with ordinary methods. These savings are due in large part to their quantity purchases.¹³ On the other hand, some progress has been made in the production of prefabricated plywood wall panels—but more research in the production of glues that will withstand a variety of weather conditions and in systems of fireproofing such panels is needed.

¹³ R. L. Davison, Hearings before the Temporary National Economic Committee, Part 11, pp. 5337, 5338.

The shop fabrication of wood panels in sizes 4 feet square and 8 feet square for frame houses seems to be making the greatest progress, and one manufacturer has been meeting with some success in the acceptance of a steel sheet and wood frame combination panel.¹⁴ Another producer has sold several hundred low-cost frame houses which are manufactured in two sections, each section capable of being transported by trailer truck.¹⁵ The market area is limited, however, by transportation difficulties. On the whole, prefabrication is going through an evolutionary process, and the period of such evolution has been too short for an evaluation of the true significance of present progress.

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¹⁴ The Harnischfeger Corporation, Milwaukee, Wis.

¹⁵ General Housing Corporation, Seattle, Wash.

CHAPTER IX

PUBLIC AID TO HOUSING

The term "public housing" has often been confused with public aid to housing. Actually, ownership of houses by public bodies in this country has had few precedents prior to the first World War, but public aid to private housing in various forms has a substantial history dating back to 1871 with the organization of a limited-dividend corporation in Boston, under public regulation, to provide low-rental homes.¹

There has also been confusion between the terms "low-rent housing" and "slum clearance" and between their objectives. The proponents of slum clearance usually include the elimination of slum dwellings and their replacement, within the same area, with housing suitable for the former slum dwellers at rents comparable with those paid for the slum dwellings. In chapter VII it was pointed out that an important factor in the creation of slums is the crowding of city land in order to maintain a high speculative or assessment value for it. The fact that land costs are excessive immediately rules out the possibility of obtaining the economies that are necessary in order to provide low-rent housing. This fact has led proponents of low-rent housing schemes to divorce slum clearance from the construction of new housing. Raw land has been considered more suitable for the new housing cost factor and the fact that it affords greater planning possibilities.

The building of low-rent housing on raw land, however, as explained in chapter VII, has brought out the fact that the construction of city facilities in new areas makes more acute the problem of maintaining municipal revenues and balancing local budgets, for the older facilities must also be maintained.² Of course, the most practical solution would be, if it were possible, to erect new dwellings at low rent on the slum sites, but housing authorities in most cities have not found this feasible with land values at the levels that have prevailed.

THE LIMITED DIVIDEND AND TAX EXEMPTION

The chief form of aid given to limited-dividend corporations has been tax exemption, either limited or unlimited. This tax exemption may take several forms. The New York law of 1926 authorized municipalities to exempt from taxation for 20 years the residential buildings constructed by these corporations.³ Actually the first act that led to tax exemption in New York in return for low rents, under public regulation, was an amendment to the O'Brien Act, passed in 1922, which permitted insurance companies, for a limited time, to

¹ Architectural Forum, January 1935, vol. 62, p. 98.

² Compare Alfred Rheinstein and Henry F. Pringle, "Why Slum Clearance May Fail," *Harper's Magazine*, October 1939, pp. 523-24.

³ The tax-exemption provisions by the city of New York expired in 1936.

invest in low-cost housing enterprises renting at \$9 per month per room. While the O'Brien Act itself did not grant any tax exemption, the city of New York passed a statute which gave such exemption on the buildings for a period of 10 years.⁴

A similar act covering limited-dividend corporations was passed in New Jersey in 1933, which, however, placed the regulation of such corporations under the supervision of the State board of public utilities. New Jersey exempted such corporations from all State and local taxes except a fee for incorporation and a tax of 10 percent on their gross income.⁵ By special statute New Jersey insurance companies have also been permitted in specific instances to invest a limited portion of their assets in construction of low-rent housing.⁶

These were forms of public aid to low-rent housing in which, in return for tax exemption and in some cases the right of eminent domain, corporations submitted themselves to public regulation as to their maximum rate of earnings and maximum rental charges.

Another form of aid to low-cost housing (i. e., low cost to the owner-occupant) was homestead-tax exemption. The States of Texas and West Virginia initiated this form of tax exemption in 1933. By the end of 1938, 13 States had passed laws which exempted from real-estate taxes to a more or less limited extent, owner-occupied residential and farm properties, usually from \$1,000 to \$5,000 of assessed value. Some of these acts exempted homesteads from both State and local taxation, while others, notably Alabama, Arkansas, Minnesota, South Dakota, and Texas, exempted homesteads from State taxation only.⁷

Another form of aid was proposed at the Temporary National Economic Committee hearings based on an experiment in Princeton, N. J., called the Lambert plan.⁸ The essence of the Lambert plan was to provide tax exemption for limited-dividend corporations but to permit such corporations to amortize only the value of the buildings and developments, the land reverting to the city in return for tax exemption. Actually, however, the Lambert plan operated much more simply than that. The Princeton project was constructed with private funds and then sold to the city housing authority at cost, in payment for which the builder accepted 4-percent tax-exempt bonds from the authority, these bonds to be amortized over a period of 28 years. This is a method of eliminating the speculative equity and at the same time attracting private capital to public housing, which is being more fully developed at present by the United States Housing Authority, as will be shown later. Low rents were achieved through (1) elimination of the speculative equity, and (2) tax exemption.

SUBSISTENCE HOMESTEADS

Actual construction of publicly owned houses for rental purposes was started by the United States Housing Corporation during the first World War, for the purpose of providing adequate dwellings for workers in war industries in localities where such dwellings were not avail-

⁴ F. W. Ecker, vice president, Metropolitan Life Insurance Co., hearings before the Temporary National Economic Committee, Part 11, pp. 5129ff, 5134.

⁵ Central housing committee, subcommittee on law and legislation, Housing Legal Digest, September 1939, supplement (New Jersey).

⁶ R. R. Rogers, hearings before the Temporary National Economic Committee, Part 11, p. 5081.

⁷ Architectural Forum, September 1939, vol. 71, pp. 206-207.

⁸ Gerard B. Lambert, Part 11, pp. 5304-5310.

able. During its existence the corporation constructed with Federal funds \$42,000,000 worth of apartments and single-family dwellings.⁹ However, after the war ended the corporation made every effort to liquidate its holdings and cease its activities.

It was not until the passage of the National Industrial Recovery Act in 1933 that another effort was made by the Federal Government to construct low-cost housing. Under section 208, \$25,000,000 was made available for "making loans for and otherwise aiding in the purchase of subsistence homesteads."¹⁰ The plan of subsistence-homestead operation was to establish small semifarming communities on the outskirts of industrial areas to take care of part-time and seasonal workers. The theory was that, by owning a house, together with a few acres of land, the industrial worker could raise enough agricultural products to maintain himself during periods of industrial inactivity. Homesteads were constructed and sold to workers with no down payment, to be amortized over a 30-year period.

The Division of Subsistence Homesteads of the Public Works Administration initiated 36 projects involving 3,498 dwelling units. Up to the time that this division was merged with the Resettlement Administration the total expenditure amounted to \$26,395,400.¹¹ The subsistence homesteads provided an average of 23.4 acres each, with a substantial house and outbuildings, at an average cost of approximately \$7,500 per unit.¹²

Following the passage of the Emergency Relief Appropriation Act of 1935 these subsistence homesteads, together with cooperative homesteads started by the Federal Emergency Relief Administration, were merged with the Resettlement Administration, which aimed to provide regular farms, part-time farms, and some suburban dwelling units in model communities. In the meantime the F. E. R. A. had established 29 cooperative communities, some of which were farmsteads and part-time farms, some garden communities, and some were simple migratory camps. A total of 3,643 dwelling units had been established by the F. E. R. A. before they were taken over by Resettlement Administration.¹³

The Resettlement Administration merged all these groups having to do with the resettlement of rural and suburban communities, and by the end of 1936 had started work on 6,425 additional units, making a total of 13,566 units initiated by the Resettlement Administration and the groups consolidated with it, at a total cost of approximately \$105,000,000.¹⁴

Of the 6,425 units mentioned above, 2,750 were in the 3 suburban-type projects, namely, Greenbelt, Greenhills, and Greendale. These 3 were the first attempts at the actual relocation of city dwellers in model communities in the suburbs of metropolitan centers. Also, these 3 projects were the first in which dwelling units were rented and not sold on a rental basis.

In 1938 the Resettlement Administration was merged with the Farm Security Administration of the Department of Agriculture,

⁹ Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Construction Activity in the United States, 1915-37, table 50, p. 87.

¹⁰ 48 Stat. 195.

¹¹ Hearings before a subcommittee of the (House) Committee on Appropriations, 75th Cong., 1st sess. on first deficiency appropriation bill for 1937, p. 252.

¹² Ibid.

¹³ Ibid., p. 253.

¹⁴ Ibid., pp. 253-255.

having first been transferred to that Department. During the fiscal year 1938-39, under the Farm Security program, a total of 2,784 dwelling units were started, of which 240 were in multifamily houses and the balance were farmstead and tenant houses.¹⁵

Except for the three suburban community projects, Greenbelt, Greenhills, and Greendale, the operations of the Farm Security Administration comprise two types of activity. The first, its principal activity, is construction of farmstead homes and provision of new farms under long-term amortization to former tenant-farm operators. Land is purchased, buildings are erected, and money is loaned for farm machinery and supplies to enable worthy tenant farmers to become owners. It is this type of activity that accounted for 1,985 of the 2,784 units mentioned above.¹⁶

The second type of operation of the F. S. A. is a continuance, more or less, of the old subsistence-homestead plan which provides homes in rural communities for both farm laborers and industrial workers and is operated through a cooperative group. The cooperative is incorporated, and although the Farm Security Administration builds the houses and whatever out-buildings are necessary, the cooperative collects the monthly payments in the form of rent and pays the interest and amortization to the F. S. A. Thus the Administration does not deal directly with the subsistence homestead group as it does with the farmstead group. This type of activity was designed chiefly for stranded areas in the hope of enabling the inhabitants of those areas to make a living through the creation of minor industries and part-time farming.

The 2,784 dwelling units started in the fiscal year 1938-39 included 800 fully modernized houses with bathrooms, at a construction cost of slightly over \$1,500 each. In the North fully plastered houses with central hot-air heating plants cost a maximum of \$2,635. The farm-houses were built for less than \$1,400 in the South and less than \$2,500 in the North. Of those in the South, 1,645 were frame buildings without bathrooms, costing an average of \$1,350.¹⁷ These have neither running water nor sewerage and hence are without plumbing. Nor have they heating plants, but most of them are supplied with stoves.

Thus aside from the 2,750 suburban units, approximately 13,600 dwelling units have been constructed for rural and semirural families, the majority of which have been built for sale to prospective farm owners.

P. W. A. HOUSING

The Emergency Relief Appropriation Act of 1935 authorized as a relief expenditure the sum of \$450,000,000 for housing.¹⁸ Of this, \$100,000,000 was allotted to the Public Works Administration to build low-cost urban housing. Since funds for rural and suburban housing were allocated to the Resettlement Administration, which activities have been described, the funds allocated to the Housing Division of the P. W. A. represented the first attempt to provide low-rent housing under Federal ownership for slum dwellers.

The Public Works Administration set up a Housing Division to erect federally owned low-cost housing and to rent it to slum dwellers.

¹⁵ Monthly Labor Review, September 1939, vol. 49, p. 637.

¹⁶ Ibid.

¹⁷ Ibid., p. 636.

¹⁸ 49 Stat. 115.

However, an act passed in 1936 authorized the P. W. A. Housing Division to set the rents on a basis which contemplated repayment to the Government of 55 percent of the initial cost of the project over a 60-year period, plus interest.¹⁹ From its creation under the act of 1935 up to December 31, 1938, 49 projects with a total of 21,447 dwelling units had been constructed (excluding two projects in Puerto Rico).²⁰

The construction of houses by the P. W. A. Housing Division was intended to be a low-rent housing scheme rather than one of slum clearance. It is argued by some that the erection of low-rent housing, regardless of location, if within the same part of the city, will tend to reduce the rentals in slum areas to the vanishing points, so that it will be impossible to maintain the slum areas, and owners themselves will naturally clear the slums. Unfortunately, this has turned out to be a very slow process and is far from having proved to be true. In many cases the result is a lowering of rents in the slum district below the rents for the new housing, and since new low-rent homes have never been available to the very lowest income groups (say those receiving under \$250 a year, of which there are about 330,000 nonfarm families) the slum areas still have a sufficiently large portion of the population to draw on.

The rents in the P. W. A. Housing Division projects average \$25.58 per dwelling unit, as the monthly total occupancy cost.²¹ This is for 41 of the occupied projects as of June 30, 1938. Since, on the basis of a rental of one-fourth of the income, to reach the lowest-income group (under \$500) it would be necessary to have rentals at \$10 per month or less, it may be seen that the P. W. A. Housing Division did not touch this group at all. On the basis of one-fourth of the income for housing, \$25 a month rent requires a family income of \$1,200 a year. And since private industry constructs some, although not enough, housing for this group, there have been numerous complaints that the P. W. A. Housing Division projects competed with private industry rather than reaching the income group that was not being serviced by industry.

The P. W. A. projects cost approximately \$4,000 per dwelling unit, and with rentals set at a point that would amortize 55 percent of the project's cost, it is apparent that the tenants were required to maintain the economic rent on a unit value of approximately \$2,200. This high cost may have been due to several factors, among them the high cost of constructing a large amount of public services and amenities which would usually be obtained with privately owned housing costing considerably more than this public housing. Construction technique had not advanced so far as it has today, nor was every advantage taken of possible economies that were available at that time. But one of the principal objectives of the P. W. A. activity in housing was to put men to work; hence economies were often sacrificed to speed in getting men to work.

However, regardless of the reasons for the lack of economies, the P. W. A. experience was sufficient to indicate that, whatever the

¹⁹ Slum-Clearance Housing Act, June 29, 1936, 49 Stat. 2025, sec. 4.

²⁰ Annual Report of the U. S. Housing Authority for the Fiscal Year, 1938, appendix I, pp. 49-50. By authority given the President by the United States Housing Act of 1937 (50 Stat. 888, sec. 4 (d)), all projects constructed by this division of P. W. A. were turned over to the U. S. Housing Authority with the provision that such projects were to be leased to local housing authorities as soon as leases could conveniently be arranged.

²¹ *Ibid.*, appendix II, p. 51.

scheme to provide low-rent housing, it must have local cooperation to be successful.

UNITED STATES HOUSING AUTHORITY

As an answer to the varied problems involved in getting a combination of low-rent housing and slum clearance, Congress passed the United States Housing Act of 1937. A review of the problem may help to furnish understanding of the objectives sought by the act. First, about 37 percent of all the nonfarm families of the United States earn less than \$1,000 a year, about 11 percent, or 2,487,000 nonfarm families earn less than \$500 a year.²² Second, real-property surveys have indicated that approximately 4,000,000 nonfarm dwelling units lack the minimum standards of decency in housing.²³ Third, an average of about 50 percent of the rent goes to meet financial obligations on rental housing, and 15 percent to pay taxes and assessments.²⁴ Fourth, as stated above, slums are brought about by the attempt—by owners, speculators, or tax assessment—to maintain land values far above those warranted by the actual land use. Finally, a solution of the low-cost and low-rent housing problem requires local cooperation.

The theory behind the new features of the United States Housing Act was that, since it was impossible for the lowest-income groups to pay economic rents on new housing, it was a proper function of the Federal Government in cooperation with local governments to make up, in the form of regular subsidy, the difference between the amount that could be afforded, using a fair portion of their income, and the economic rent necessary to provide decent standards of housing. The amount of the annual Federal subsidy was to be based on the circumstances of the particular project and was not to exceed the equivalent of the going interest paid, at the time the contributions were contracted for, by the Federal Government (on bonds of 10 or more years' duration) plus 1 percent on the total development cost.²⁵ In order to obtain local cooperation the political subdivision concerned was required to make annual contributions, in cash or tax exemptions, equal to at least 20 percent of the Federal subsidy.

The act further provided that the housing was to be built and managed by local housing authorities and that a maximum of 90 percent of the funds for the development cost should be loaned by the United States Housing Authority.²⁶ Since the lowest-cost housing cannot be built on high-cost land, the act aimed to obtain slum clearance without having the new housing necessarily built on slum areas. Thus, the act specifies that, for each new dwelling unit provided the local authority must require the demolition or effective repair of a slum unit.²⁷ Construction of new units on vacant land was thereby made possible.

The capital originally provided for the United States Housing Authority was increased by an amendment to the act in 1938 which theoretically permitted a total of \$800,000,000 of loans to be made on

²² Table VII, ch. III above.

²³ Isador Lubin, hearings before the Temporary National Economic Committee, Part 11, p. 4958. See also p. 22 above.

²⁴ See p. 45 above.

²⁵ 50 Stat. 888, sec. 10. See also Nathan Straus, testimony, hearings before the Temporary National Economic Committee, Part 11, pp. 5419 ff.

²⁶ 50 Stat. 888, sec. 9.

²⁷ *Ibid.*, secs. 10 (a), 11 (a).

the basis above stated.²⁸ The authorization for subsidies was also increased to a total of \$28,000,000 per year.²⁹ This \$28,000,000, however, is insufficient to pay subsidies on the total construction that could be produced by the \$800,000,000 in loans; hence the authorization for subsidies limits the Housing Authority's activity to a maximum of about \$693,000,000.³⁰

Up to December 31, 1939, loan contracts amounting to \$581,776,000 had been signed, and 64,575 units in 163 projects had been placed under construction.³¹ The average over-all cost per unit of those under construction was \$4,486, with an average net construction cost per unit of \$2,821.³² The estimated shelter rent per dwelling unit, that is, rent for shelter, exclusive of heat, light, gas, etc., ranges from \$6.59 per month in Austin, Tex., to \$16.64 in New York City with an average of \$14.28 for the entire group.³³

It may be seen that the average rents are substantially below those of the P. W. A. Housing Division, due of course to the subsidy and to the fact that in the case of P. W. A. housing rents must be high enough to liquidate 55 percent of the cost within 60 years. Thus far the lowest-income group reached by completed U. S. H. A. projects is between \$400 and \$500, and occupants are limited to families with initial maximum incomes ranging from \$612 per annum for the smallest-size families in Austin, Tex., to \$1,399 per annum for the largest-size families in New York City.³⁴

The fact that ultimately its authorization will enable the Authority to produce some 160,000 to 170,000 units for the \$400-to-\$1,400-per-year income class, will have a substantial effect in reducing slum areas.

W. P. A. HOUSING

The Work Projects Administration has contributed to experiments in low-cost housing, although some of its experience in direct construction of housing has been unsatisfactory. The most successful W. P. A. activity in providing low-cost housing was in Fort Wayne, Ind. The Fort Wayne Housing Authority built 50 units at an actual cost of approximately \$900 per unit. This was achieved because first, W. P. A. furnished, without cost, all the labor, and second, no expenditure for land (except \$1 per lot) was necessary.³⁵ The local authority borrowed the money for materials and incidental services from the Federal Housing Administration, to be repaid on a 20-year mortgage. W. P. A. labor both fabricated (in a specially built factory) and assembled the houses. The city exempted these houses from all taxes, hence the total cost to be included in the rent was limited to capital charges of about \$6 per month per unit (representing interest at 4½ percent, amortization and insurance on the loan

²⁸ 52 Stat. 809, title VI, sec. 602.

²⁹ *Ibid.*, sec. 601.

³⁰ This is a later estimate than that of Mr. Straus in the Temporary National Economic Committee hearings, Part 11, pp. 5409, 5410.

³¹ U. S. Housing Authority, Public Housing, January 16, 1940, p. 4.

³² Annual Report of U. S. Housing Authority for the Fiscal Year 1939, table IV, p. 7.

³³ Data from the U. S. Housing Authority, November 27, 1939; final rents set on 13 completed projects.

³⁴ Compare Nathan Straus, hearings before Temporary National Economic Committee, Part 11, p. 5426.

³⁵ Land was turned over to the city on a lease basis of \$1 per lot and tax exemption, but could be reclaimed on a sliding scale basis (within 1 year upon payment of the cost of removal of the improvement to another site). This method allowed the owners of land about to become tax delinquent an opportunity to retain ownership at no cost to them.

of \$900), and less than \$5 for maintenance and operation, or a total of less than \$11 per month.³⁶

The complaints about the Fort Wayne project fall chiefly into three classes. One type of complaint comes from labor unions because the project was accomplished with relief labor, and the houses do not meet the ideals of middle-class comfort and lack many facilities ordinarily expected in public housing. Much of this, however, is window-dressing. The principal complaint is that relief labor constructed the houses at relief wages; and the labor unions argued, that if this principle is extended it will have the effect of putting more and more regularly employed building labor on the relief rolls by competing with the other types of public housing which are built by contractors. The answer, of course, is that other types of public housing cannot meet the rentals of this class of occupancy and therefore do not compete. The second type of complaint comes from material manufacturers and contractors, for much the same reasons, that they did not get the full share of the work and material sales from this project that they have come to expect from public housing projects. A third type of objection has been voiced by city planners who rightly point to the fact that the project contains no special nondwelling facilities and the houses are located haphazardly in slum areas. This is, of course, true. Since the authority does not take title to the land, no permanent improvements could be made; and the locations were dependent upon special conditions of availability.

An earlier experiment in the use of the W. P. A. for public housing was not so successful. This was an attempted remodeling project for the New York Housing Authority.³⁷ In spite of the use of relief labor on this project the cost was equal to that of any of the new housing projects of that Authority. This seems to indicate that the use of relief labor in itself will not insure low costs, but that economies must be found in all elements of housing cost in order to reach the lowest-income group.

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³⁶ The Fort Wayne Housing Plan, a brochure published by the F. H. A. Described also by Philip Wagner in the Baltimore Evening Sun, Jan. 25, 1939, p. 15.

³⁷ First Houses, New York City.

PART II
THE RELATION OF PRODUCTIVITY TO
LOW-COST HOUSING

By
R. HAROLD DENTON

LETTER OF TRANSMITTAL

Hon. Senator JOSEPH C. O'MAHONEY,
Chairman, Temporary National Economic Committee,
Washington, D. C.

MY DEAR SENATOR: The housing problem, like the industry itself, consists of many parts. This study is focused upon the reasons why we have not successfully achieved low-cost housing. It is concerned with the initial cost of construction and not with those costs and rates which are so important in determining the continuing cost to the occupier.

The problem is defined as one of low productivity. Dollars spent for construction are wastefully spent. They not only fail to take advantage of new technology and management techniques, but are aggravated by the belief that a limited amount of work is available, the resistance to standardization, and the lack of any coordinated effort.

Positive restrictions appear in such forms as restrictive labor policies, inflexible price policies, and "special interest" building codes.

The Federal Government is already attacking this situation at various points, notably through the Department of Justice. Much more can and should be done by the several agencies in the housing field. The outstanding gap discussed in the study is in the area of research. Contractors are too small to be able to carry on research. Manufacturers of building materials have their interest focused on their own products. No agency exists which is concerned with the whole problem of the best processes and materials for low-cost housing. The recommendations by the author deserve careful consideration by all who are concerned with the problem of providing decent houses for families with low incomes.

WILLARD L. THORP.

WASHINGTON, D. C., March 1, 1940.

THE RELATION OF PRODUCTIVITY TO LOW-COST HOUSING

INTRODUCTION

In the search for a method by which unemployment might be relieved and general recovery brought about, it has come to be generally accepted that the building industry offers probably greater opportunities for expansion than any other industry. Since the beginning of 1938 building activity has increased rapidly, although it is still far below pre-depression levels. Despite this current activity, however, the potential market for better houses has barely been touched.

The problem of inadequate housing is not a depression problem. Millions of families were poorly housed in America even before 1929. It is not a problem peculiar only to the United States. Prior to the outbreak of the war Great Britain had made far greater progress toward providing decent houses for the working classes than had the United States yet conditions were far from satisfactory.

Inadequate housing in this and other countries is largely a result of the excessive cost of building: Other charges which add to the ultimate costs of ownership or renting, such as interest, fees, commissions, and real-estate taxes, are, with a few minor exceptions, simply percentage charges which are directly related to the original cost of the house. Each is automatically reduced as the capital cost of the house is lowered.

For example, costs of financing may be reduced in either of two ways—by lowering the interest rate or by reducing the amount borrowed. A 50 percent reduction in building costs will cut the costs of financing almost in half without any reduction in the interest rate. Likewise, a reduction in building costs will reflect itself in a reduction in property taxes, since the tax rate is a percentage charge upon the value of the property, of which the cost of the house represents perhaps 85 percent and the cost of land the remaining 15 percent. The reduction in taxes may not be exactly proportionate to the reduction in building costs, since if property values should generally decline as a result of lower building costs, the tax rate or the assessment ratio might be increased.

Much has been done in the last 7 years to reduce financing costs upon home mortgages through the Federal Housing Administration and the Federal Home Loan Bank Board system. Also, the Federal Government has in the last few years embarked upon an extensive program of slum clearance through partial subsidy. Each of these programs was highly desirable when enacted and has generally proven effective for its particular purpose. Low interest rates and a plentiful supply of mortgage money, low property taxes and a shift of some of the burden of local taxes away from residential properties, low maintenance costs—all are essential to a complete solution of the housing problem. For some time to come also the lowest-income families

must be assisted by subsidy if they are to live in decent accommodations. But by far the most effective way to provide adequate housing for all income groups, and without which it cannot be provided, is through the substantial reduction of building costs.

For example, comparing the effect upon monthly or annual charges for housing of identical reductions in the interest rate and in building costs, a 50 percent reduction in the interest rate would result in a 17.6 percent reduction in total monthly or annual charges for housing, whereas a 50 percent reduction in the original cost of the house would cut the monthly or annual cost by 42.5 percent.¹

It should be noted that the price of land is not directly related to the cost of building, as are most of the charges mentioned above. Land price, however, is a subject for special study and has not been given consideration in this report. Its importance should not be minimized. Unless land prices and land speculation are controlled, a part of any savings which may be achieved in the cost of building houses is likely to be offset by increases in the price of land.

The effects of high building costs are clear from the following figures. The average appraised value of new single-family houses financed with loans insured by the Federal Housing Administration during 1938 was \$5,530. Only 4 percent of the new houses were valued at less than \$3,000 and only 19 percent at less than \$4,000. The annual income of mortgage borrowers during 1938 averaged \$2,968. Only 21 percent of the families earned less than \$2,000. Comparable figures of cost and income were even higher during 1936 and 1937.² Yet a study of family income conducted by the National Resources Committee showed that 79 percent of all families in the United States had incomes of less than \$2,000 during 1935 and 1936, and that approximately 92 percent earned less than the average F. H. A. borrower.³ In other words, building costs are so high that new houses are being built for only a very small percentage of the highest-income families.

It is not necessary, of course, that low-income families should live in new houses, just as it is not necessary that they should have new automobiles. Good second-hand or third-hand houses may be far more desirable than cheap new ones. When only a very small percentage of the population can afford to build new houses, however, the process of filtering requires that low-income families live in tenth- or eleventh-hand houses which are not fit for human habitation.

Building houses exclusively for the richest 10 or 15 percent of the population is like manufacturing only Cadillacs, Packards, and Rolls Royces. If the automobile industry manufactured cars for only the richest 10 percent, it is easy to imagine the condition of used cars which the lower income groups could afford, if they could afford any at all.⁴ Houses must be built for the middle-income groups as well as the upper, if the lower-income families are to be taken care of in used houses that are still fit to live in.

The solution to high building costs does not lie solely in the elimination of exploitation through high wages, prices, commissions, and fees. It requires primarily the more fundamental approach to cost reduc-

¹ See "Exhibit No. 1," appendix E, p. 175.

² Fifth Annual Report of the Federal Housing Administration for the year ending December 31, 1938, pp. 91 and 101. See "Exhibit No. 2" and "Exhibit No. 3," appendix E, p. 177.

³ Consumer Incomes in the United States, National Resources Committee. August 1938, p. 18. See "Exhibit No. 4," appendix E, p. 178.

⁴ See "Exhibit No. 5," appendix E, p. 178.

tion through the elimination of obsolete methods, materials, and restrictive practices employed in the building industry. The production of houses has lagged far behind other industries in technological improvement, and a superficial treatment of the problem will not bring results.

The handicraft methods employed in the building industry are detrimental to labor, to management, and especially to the consumer in need of housing at a reasonable price. Under these methods bricklayers, carpenters, plasterers, plumbers, and other workers cannot usually afford to live in new houses which they help to build, and many building craftsmen are compelled to occupy substandard dwellings. Moreover, by restricting demand, technological backwardness in the building industry is responsible to a very large degree for the serious unemployment which exists among building workers even in normal times.

Unless productivity is increased in the building of houses to balance the steady increases in efficiency in other industries, standards of housing will steadily decline in relation to the general standard of living, or rents will consume a larger and larger proportion of the family budget.

It is the purpose of this report to study certain fundamental characteristics of the construction industry, particularly of the building industry, in an endeavor to suggest several specific steps which might be taken toward the substantial lowering of building costs, either by private enterprise acting alone or in cooperation with the Federal Government. A sound solution to this problem offers important opportunities not only for sustained economic recovery in all lines of business activity but for an expanded prosperity.

The report is not intended to single out any one group in the building industry for special criticism, because no single group is responsible for excessive building costs. Restrictive practices are employed by labor, contractor, materials suppliers and manufacturers, architects, political bodies, and even the general public in its resistance to change.

The procedure followed in the report is briefly to consider the place of the construction industry in the national economy and its importance to business recovery, to describe the existing organization of the building industry and the process by which houses are produced, to analyze certain fundamental principles regarding productivity and costs and their relation to the building of houses, to discuss the need for scientific technological research, and finally to suggest certain recommendations for desirable action.

CONSTRUCTION IN THE NATIONAL ECONOMY

In terms of workers employed, the construction industry is one of our major industries. In 1930 an estimated average of over 3,000,000 workers were directly dependent upon construction for employment, or more than were employed in the group of industries manufacturing iron and steel products, machinery, and transportation equipment, including automobiles.¹ In addition, nearly twice as many workers were employed in industries engaged in supplying the construction industry with materials. Altogether, the construction industry, directly and indirectly through consumption of materials, accounted

¹ Construction Activity in the United States, 1915-37, Bureau of Foreign and Domestic Commerce, 1938, p. 27.

for about 15 percent of all commodities that were produced in the United States from 1919 to 1935.²

Construction work varies from the dredging of streams and harbors to the painting of kitchen cabinets. It includes the building and repairing of houses, stores, office, factory, and public buildings, highways, canals, railroads, airports, bridges, dams, pipe lines, power plants, communication lines, waterworks, and levees.

After 1929, construction activity fell to much lower levels than other business, and has failed to regain its relative position in the national economy. In that year, the income created by the contract-construction branch of the construction industry accounted for 4.5 percent of the total national income. By 1933 this proportion had fallen to 1.3 percent, and in 1938 had risen to only 2.7 percent. Moreover, the contract-construction industry produced less from 1932 through 1938 in relation to its 1929 volume of income than did any other major group of industries, reaching only half its 1929 volume in 1937.³ This index brings out clearly the importance of a revival in building to general business recovery. During the entire decade of the depression, the construction industry has been further depressed than any other major industry. A disproportionate share of the unemployed have been building-trades workers. Likewise, a more than proper proportion of the idle plant capacity has been in those industries which supply the construction industry with materials, which include the key industries of the country.

This report is primarily concerned with housing for several reasons. Residential building normally represents a larger part of construction activity than any other type of work, accounting for over half of all private construction from 1915 to 1936.⁴ It is therefore of special importance in relation to general business recovery. Residential building also fluctuates more violently than other types of construction activity, dropping from a peak of nearly 900,000 new units, built in 1925, to about 60,000 in 1934.⁵ It has lagged far behind recovery in other major fields of business activity. Housing is of prime importance to every individual, consuming a greater proportion of family income than any other single item except food. Finally, the demand for houses is highly flexible and is primarily determined by costs. The potential market is great. Opportunities not only for general business recovery but for an expanded prosperity through sound reduction of housing costs are exceptionally good.

ORGANIZATION OF THE BUILDING INDUSTRY

The building industry is chiefly characterized by its lack of uniformity in organization or type of work. It is comprised of small, local enterprises, each of which operates almost entirely independently of every other, and no one of which predominates in determining the ultimate cost of a house. Labor is its own production manager, performing both planning and physical operations. There is little cooperation between various groups in the industry either locally or nationally. Each is concerned only with its own immediate ad-

² Testimony of Dr. Isador Lubin, Commissioner, Bureau of Labor Statistics, before the Temporary National Economic Committee, Hearings, Part XI.

³ Survey of Current Business, Bureau of Foreign and Domestic Commerce, June 1939, p. 11. See "Exhibit No. 6," appendix E, p. 179.

⁴ Construction Activity in the United States, 1915-37, Bureau of Foreign and Domestic Commerce, 1938, p. 11.

⁵ Ibid, p. 41.

vantage, and no one has any effective control over total production costs.

Houses are built principally by the contract-construction branch of the construction industry, as distinguished from concerns performing construction for their own use with their own employees. The contract-construction industry is in turn divided into two groups of concerns; namely, those whose principal or sole activity is construction work, and those primarily engaged in other lines of activity but participating in construction in connection with the sale of their products. A manufacturer of furnaces or a dealer in electrical supplies who installs his own products falls into the latter classification. The contract-construction industry may also be divided into two types of operators, general contractors and special-trade contractors. The first assume the contract for an entire construction job, and may act as agent for the owner; the second restrict their activities to a specialized part of the job.

Beyond this broad grouping, there is no fixed pattern of organization in that part of the contract-construction industry engaged in residential building. The prospective home owner may, for example, build a cabin entirely with his own labor, from materials supplied by himself. On the other hand, he may purchase his house ready for occupancy from a speculative builder, just as he would buy a radio or automobile from a dealer. He may or may not have an architect. He may hire a carpenter to sketch out the plans and act as contractor, or he may engage a specialized general contractor. The general contractor may use his own men for the entire job, or he may act merely as broker, subletting all or a major part of the work to special-trade contractors. The general contractor may purchase all the materials used or only those not involved in the subcontract work. Building contractors ordinarily purchase their materials at retail from the local lumberyard or hardware store. In some cases, however, they may buy direct from the wholesaler or from the manufacturer.

This lack of uniformity in the building industry raises the presumption that one type of organization has not proved itself predominately more efficient than another. Small operators, building only a few houses a year, are able to compete successfully with large contractors or speculative builders.

The answer to the problem of wide diversity in organization of the building industry is the same as to the problem of high building costs, and lies in the nature of the production process itself, which is little different on a large project or small, or whether the builder is a small operator or a large corporation.

Before considering further the organization of the building industry and the question of costs, several factors should be emphasized which distinguish construction from other types of economic activity. In manufacturing, the factory can be located where production is most efficient because the final product is usually comparatively small in size or mobile. Construction, on the other hand, involves some physical change in or addition to land at a particular location, and the greater part of the operations have traditionally been performed at the site. The problem of most efficient location for production has not been considered a matter of choice. Obviously, a dam must be built where it is needed. Even a house is larger than most products of the manufacturing industries.

Despite the limitations imposed by their weight and size, many construction works have been related to their site to far too great an extent. This is particularly true of houses. Admitting that it is not feasible with existing transportation facilities to manufacture a complete house in a central plant and ship it to the site, although a few companies have done it, great economies could be gained by manufacturing larger units of the house than a brick or bag of cement.

Under the present system, each new construction job becomes a factory in itself. When the project is a dam or skyscraper there is as much opportunity for efficiency as in any factory, because of the size of the job. When, however, a factory must be set up to build a small house which will cost but a few thousand dollars, inefficiency and waste are inescapable. Even upon large housing projects, essentially the same building methods are used, although some economies are gained through central purchase and distribution of materials. Labor performs its task very little differently, and no single contractor handles more than a relatively small part of the work. On both large and small projects the building process is largely one of brokerage, with countless separate and independent concerns and individuals brought together, each performing its own particular operation as a separate and distinct business, charging a retailer's commission for every service rendered.¹

As an indication of the large number of small concerns engaged in construction work, the records of the Social Security Board show that there were almost 97,000 employers in the contract-construction industry during the first 3 months of 1938 who employed at least 1 man at some time during that period. Most of these contractors were engaged in residential building, operating upon a very small scale. Eighty-three percent had fewer than 10 employees on their pay roll at the end of March 1938, including both clerks and manual laborers. Over half had fewer than 4 employees.² In addition to this large number of contractors there were probably some 50,000 or more operating without employees during the first 3 months of 1938, as well as a large number of materials suppliers engaged in construction work as a minor activity.

The amount of business done during any one year by the average contractor is also exceedingly small. Almost 70 percent of the establishments engaged in all types of construction work covered by the 1935 Census of Construction performed less than \$10,000 worth of work during that year.³ Many contractors do not maintain a regular place of business, but operate from their homes. Relatively few maintain a continuous group of employees, hiring labor as they need it on an hour-to-hour basis.

Houses are built almost entirely by local enterprises which operate only in their own city or its suburbs.⁴ Materials are bought from local retail stores.⁵ Labor is usually local. Few contractors maintain branch offices in other cities, except in the case of certain large materials manufacturers who install their own products, and the participation of the latter in the building of any particular house is

¹ See "Exhibit No. 7," appendix E, p. 179.

² Preliminary data secured from the Social Security Board for use in public hearings before the Temporary National Economic Committee, Hearings, Part 11. See "Exhibit No. 8," appendix E, p. 180.

³ Census of Construction, 1935, Bureau of the Census, vol. III, p. 30. See "Exhibit No. 9," appendix E, p. 182.

⁴ See "Exhibit No. 10," appendix E, p. 182.

⁵ See "Exhibit No. 11," appendix E, p. 184.

small.⁶ Very few contractors are members of a national trade association.⁷

Not only are houses built by local enterprises, but the viewpoint throughout the building industry is distinctly local, although housing is a national problem affecting the national economy in many important ways. The narrowness of this viewpoint has resulted in a variety of restrictive devices which have been set up in each locality to maintain the traditional system and the traditional relationships. Innovations of any nature are fought vigorously. Use of new materials, methods, or labor-saving devices is seriously restricted.

No single element of the industry is responsible for its lack of effective organization, because none is of itself predominantly important as a determining factor in the cost of the finished house. The electrical supply dealer, for example, specializes in selling and installing electrical wiring and equipment in the house. The manner in which houses are wired may be technically obsolete. Yet electrical work represents only about 3 percent of the final cost of the house. The dealer therefore has little interest in the house as a completed unit, and any savings which he alone might effect would only slightly alter the ultimate cost. The same is true with every other element in the industry, whether it be to the carpenter, plumber, mason, supply dealer, or manufacturer. Each participant operates independently of every other, except through a brokerage arrangement, and no one has effective control over or great interest in the total cost of production.

Production management as it is understood in modern manufacturing industries is practically unknown in the building industry. The general contractor would appear to correspond to the plant superintendent. His functions, however, are not at all similar. He has very little control over production methods. His control over labor is almost entirely limited to his power to hire and fire, and even that is restricted. Tradition in the building industry has ruled that each tradesman should be sufficiently well trained in his craft to assume the management functions of planning and supervision. Each worker is given almost complete independence in his use of methods and tools. A foreman may act as his immediate supervisor, but in most cases the foreman is not an agent of the contractor. He usually represents the workers, and, in fact, is one of them.

Not only does labor operate independently in the building industry, but every other group performs its own specialized operation as though it were in fact a separate industry. Each acts as its own manager, with no more coordination than the general contractor is able to exercise through his powers as broker.

Attempts have been made in recent years, in several of the larger cities, to increase cooperation in the industry through the establishment of code authorities. Their expressed purpose is to prevent so-called unfair competition in bidding and other practices. Bid depositories have been set up to prevent bid shopping and bid peddling. As they have been organized, the authorities merely serve to accentuate the independence of the separate groups within the industry. The master plumbers, for example, have their own separate and distinct code authority to protect the interests of their own specialized business. The contracting plasterers have their own code.

⁶ See "Exhibit No. 12," appendix E, p. 1b.

⁷ See "Exhibit No. 13," appendix E, p. 188.

A more encouraging development in the larger cities has been the organization of building congresses aimed at the promotion of the building industry as a whole. Their influence in coordinating the separate elements into which the industry is divided, however, has not been great, although they contain the germ of a movement which may become important.

There is not even an effective national trade association to bring the independent groups together. The contractors have separate and distinct associations for each type of contracting. Architects are organized separately. Materials manufacturers and suppliers have their own trade associations.⁸ Every cooperative effort is designed to protect the interests of a special group, which, by itself, is relatively unimportant in the production of a house.

Effort was made in 1923 and again in 1931 to organize a national association for the construction industry which would coordinate the separate elements. The first of these, the American Construction Council, was almost completely ineffective. The second attempt, resulting in the organization of the Construction League of America, was somewhat more successful. Its principal activities were in connection with the preparation of the N. R. A. Code for the Construction Industry. Since that time, its activities have been greatly restricted.

PRODUCTIVITY AND COSTS

The extremely small size of enterprises, the local nature of operations, the lack of coordination between the various independent groups in the building industry, all are contributing factors to the problem of excessive building costs. It is necessary, however, to look deeper into the building industry to discover a fundamental basis for attack. It is not simply a question of larger concerns, or cooperation through trade associations. The real problem is that of low productivity.¹

Low productivity in the building industry may be traced to many causes, the most important of which are lack of coordination and systematic organization, failure of the industry to keep pace with other industries in technological improvement, prevalence of restrictive practices throughout the industry which deliberately limit output and prevent the introduction of cost-saving materials and methods, backwardness of design and lack of standardization in measurements which prevent mass production of larger units of materials, and the retarding influence of tradition.

There are many ways of increasing productivity in the building of houses. It is possible through this approach to cost reduction to maintain wages and profits at a reasonably high level and at the same time greatly reduce the cost of housing to the consumer, without lowering the standards of construction. The same fundamental economic principle that costs depend primarily upon productivity applies in the case of housing as in the production of any other commodity. The most progressive manufacturing industries, paying the highest wages, gaining the largest profits, and selling their products at the lowest prices, are those in which productivity is greatest. To secure the substantial reductions in housing costs which are needed will, by any other approach, necessarily require either greatly reduced

⁸ See "Exhibit No. 14," appendix E, p. 188.

¹ See "Exhibit No. 15," appendix E, p. 189.

wages, uneconomic prices for materials, or a substantial reduction in standards of construction.

This does not mean that wages for certain crafts in the building industry are not too high, nor that prices of materials are reasonable. Some reductions in these money charges on the industry should be made. But wage and price reductions will not alone solve the housing problem. The building industry is a customing industry, producing a product to individual measurement by wasteful handicraft methods. Until system and efficient methods of production are introduced, housing costs will remain beyond the reach of most families.

Certain general principles will serve to emphasize the importance of productivity not only in the building of houses but in every industry. Productivity is defined as the output of goods or services per unit of time and per unit of energy. It is usually measured in terms of the physical amount of a commodity which one man can produce in an hour. It can, however, be measured in terms of output of a crew of workers per hour, or of a plant, or of an industry, or even of the Nation as a whole. The unit of time may be an hour, a week, a month, or any definite period.

Ordinarily the cost of any commodity, whether it be a house or an automobile, is measured in terms of money. It is not dependent upon money, however. Cost was involved long before money came to be used as a means of exchange. The cabin which the pioneer built with his own labor from logs which he cut himself, represented a cost to him even though no money was involved. If through greater skill he could build the cabin in half the time which it took his neighbor, the cost to him was just half as much. That much more of his time and labor was available for another purpose, for hunting food, making his own clothing, or simply enjoying himself.

Fundamentally, then, costs of houses or other commodities are reduced not by cutting wages or other money charges, but by increasing the efficiency of the production process so that men can produce more of the product in a given unit of time. In a great many industries, wages have been raised to high levels, while at the same time costs have been greatly reduced and prices lowered by the more efficient utilization of the factors of production. Further increases in wages and reductions in prices in these industries will be brought about when the philosophy of volume production is accepted in American industry, and the benefits of increased productivity distributed more widely.

In a study of blast furnaces made by the Bureau of Labor Statistics and the Bureau of Census in connection with the 1929 census, it was found that the plants having the lowest output per man-hour were those paying the lowest hourly wage, while the plants with the highest man-hour output were those paying the highest wages. In the highest-wage plants man-hour production was more than 11 times as great as in the lowest-wage plants. In the highest-wage plants, labor costs per unit of product were less than half as much.² A study of the lumber industry showed similar results.³

In the manufacture of electric lamps, productivity increased 229 percent from 1920 to 1931 for the industry as a whole.⁴ In tire manu-

² Monthly Labor Review, Bureau of Labor Statistics, August 1932, p. 264. See "Exhibit No. 16," appendix E, p. 190.

³ Monthly Labor Review, Bureau of Labor Statistics, October 1932, p. 818.

⁴ Handbook of Labor Statistics (1936 edition), Bureau of Labor Statistics, p. 719. See "Exhibit No. 17," appendix E, p. 190.

facture, man-hour output increased nearly six times from 1914 to 1931, despite outstanding improvements in quality.⁵ In the production of leather, productivity increased 300 percent from 1849 to 1935.⁶ Low-priced automobiles, radios, washing machines, and other commodities would not be on the market today except for the remarkable increases in productive efficiency which have been achieved in manufacturing.

In addition to the manufacturing industries, productivity has increased rapidly in mining, in railroad transportation, in the telephone and telegraph industries, and even in agriculture.⁷

It is true that the consumer has not always benefited from increases in productivity. According to the National Bureau of Economic Research, the benefits from increased productivity in the manufacturing industries since 1914 have gone principally to the producers in the form of higher wages and profits, instead of to the consumer in the form of lower prices.⁸

The solution to technological unemployment and inadequate purchasing power, however, does not lie in the restriction of output, the too great shortening of hours, or in the return to hand methods of production. A high standard of living is not possible in a nation where productivity is low. It may not exist in a nation where productivity is high. In the one case it cannot possibly be achieved; in the other it may or may not, depending upon the adequacy of the system of distributing the benefits of increased productivity in the form of lower prices, thereby increasing demand for the product, or releasing purchasing power for expenditure upon other commodities.

In the building of houses, certain technological improvements have been introduced since 1900. The concrete mixer is now used instead of the old hand methods of mixing. Power saws and pipe-cutting machines are in use on some construction jobs. Portable belt conveyors are available for the distribution of materials, and power shovels save many hours of labor time. Paint sprays, the cement gun, plaster gun, electric welding machines, and other power-driven tools are available for the building contractor. With very few exceptions, however, houses in America are still built by handicraft methods and increases in productivity throughout the building industry have been very slight. In fact, there is evidence to indicate that in some localities productivity has actually declined because of deliberate restrictions imposed upon output.

It should be observed that productivity has increased in many industries engaged in the manufacture of building materials, and in this respect there has been technological progress in the building industry. Although building materials are produced by modern mass production methods, however, they are merely the raw materials from which a finished product is to be made. The efficient production of building materials may not necessarily result in the efficient production of houses. A house is assembled from many thousands of small individual pieces. A four-room brick-veneer house, for example, will require over 18,000 bricks, each of which must be handled many times before it becomes a part of the house. The roof alone will contain

⁵ Bulletin No. 585, Bureau of Labor Statistics, July 1933. See "Exhibit No. 18," appendix E, p. 190.

⁶ Monthly Labor Review, Bureau of Labor Statistics, July 1937, p. 73. See "Exhibit No. 19," appendix E, p. 191.

⁷ Summary of Findings to Date, March 1938, National Research Project on Reemployment Opportunities and Recent Changes in Industrial Techniques, Works Progress Administration.

⁸ Prices in Recession and Recovery, Frederick C. Mills, National Bureau of Economic Research, 1936, p. 454.

some 9,000 shingles, each of which requires separate handling. Besides bricks and shingles, there are thousands of other units of lumber, cement, sand, plumbing, electrical equipment, etc., which must be manufactured, shipped to the warehouse, trucked to the site, measured and cut or mixed, and finally installed in the house piece by piece. The units of material are so small, and the methods of assembly so inefficient that increases in productivity in the manufacture of building materials have had little effect upon the ultimate cost of the house, either its real cost or its money cost.

The building industry has not kept pace with other major industries in many important respects. It is only slightly mechanized; each group in the industry operates upon the unsound doctrine that there is only a limited amount of work to be done, and each has imposed a variety of restrictions designed to protect its share of the work; the industry has refused to recognize methods of production management which have greatly increased productivity and reduced costs in the manufacturing industries; there is little standardization even of essential elements; each specialized group in the production of a house has set itself up as an independent business with practically no coordination or over-all management; the attitude of the public, of governing bodies, of architects, of labor, of real estate boards, contractors, and materials manufacturers alike toward the production of housing has been rigidly bound to tradition; there has been practically no scientific laboratory research upon the house as a complete unit.

Considering each of these points separately, it will be apparent what steps must be taken before housing costs can be greatly reduced. All of the limitations in the building industry mentioned above very seriously restrict productivity, are basically responsible for the haphazard organization of the industry, and result in exorbitant costs of building.

Mechanization.—The tools used in the building of houses are mainly hand tools. Very little power machinery has been introduced. The carpenter, bricklayer, and plumber use essentially the same tools which they used many years ago. The workers usually furnish their own kits, and the investment is relatively small. A bricklayer's kit, for example, will cost about \$20, a carpenter's kit about \$90, and a painter's kit consists of a putty knife and a pair of overalls. In recent years the contractor has furnished certain power tools and other equipment for use on the job, such as excavating equipment, concrete mixers, paint brushes, etc. In 1929, however, the average residential-building contractor had a total investment in equipment of less than \$2,000, or only \$175 per employee upon the basis of the average number of employees on his pay roll during the year. The average investment in equipment per employee was considerably lower for building contractors than for those engaged in any other type of construction work. For example, highway contractors owned more than a thousand dollars worth of equipment per employee as compared with less than \$200 for those engaged in residential building. The only building subcontractors who showed a relatively high degree of mechanization were those engaged in steel erection, stone work, excavating, wrecking, and ornamental iron work. Masonry, painting, and plastering contractors were especially low.⁹

⁹ Fifteenth Census of the United States, 1930, Construction Industry, p. 96. See "Exhibit No. 20," appendix E, p. 191.

The significance of mechanization is clearly indicated in the case of highway construction, which, as noted above, was more than five times as highly mechanized as were contractors in the housing field. Where formerly horses and wagons were used to move earth in highway construction, steam shovels and mechanically driven scrapers are now employed. Tractors and huge concrete mixers have further contributed to cost reductions. Mechanization in highway construction has advanced so far that the same expenditure which in 1923 would have built 100 miles of highway would have built 146 miles of the same type in 1935, and 162 miles in 1938,¹⁰ despite general increases in wages for highway workers.

In the wrecking of buildings also mechanization has produced remarkable results. A 5-ton crane equipped with a 1,500-pound "skull cracker" will accomplish the work of 100 men at one-eighth the cost, doing the same work with one blow that 2 men could formerly do in an hour and a half.¹¹

Lack of mechanization in the building industry may be attributed to several causes. Contractors usually operate upon too small a scale to justify a large investment in equipment. Entirely satisfactory machinery for all building operations has not been developed, partly because many of the operations are by their nature hand operations, such as bricklaying. Furthermore, building-trades-unions have vigorously opposed introduction of labor-saving machinery and devices. For example, an agreement between the painters and contractors of Wilkes-Barre, Pa., states that "the use of the spray gun is absolutely prohibited, and no member shall be permitted to work on any job where a spray gun is being used. The party of the first part agrees to use paint brushes not to exceed 4 inches in width on work of any kind except when applying water paint."¹² Plumbers, in many localities, are required to cut and thread pipe by hand power on the job. Plasterers are restricted in the use of the plaster gun; carpenters in the use of power saws, mortisers, and power planers.

Some of these union restrictions are specifically written into agreements with the contractors, as in the case noted above for Wilkes-Barre, Pa. In other cases, unions prohibit their members from using the devices or specify the conditions under which they may be used, penalizing the members for violation either by fine or expulsion from the union.

Belief in limited amount of available work.—The belief that there is only a limited amount of work to be done prevails throughout the building industry. It serves both to raise money charges in the industry to uneconomic levels and to restrict productivity. Manufacturers of building materials maintain prices at sufficiently high levels to insure a profit at comparatively low rates of operation. Labor sets its rates of wages at high levels upon the assumption that there is only a certain amount of work to be done. Both labor and manufacturers are sufficiently well organized to enforce their demands. These excessive money charges, although they do not yield their recipients a necessarily large return, at least in the case of labor, add to the money cost of each house that is built, restrict demand, reduce employment, and encourage further efforts toward wage and price increases.

¹⁰ Price Trend in Highway Construction, Bureau of Public Roads.

¹¹ American Builder, August 1928, p. 92.

¹² Agreement between Brotherhood of Painters, Decorators, and Paperhangers, Local 41, and Employing Painters of the City of Wilkes-Barre and Vicinity, Pennsylvania, in effect October 31, 1939.

Even more serious than its effects upon money charges in the industry, however, are the effects imposed by this doctrine upon productivity. Uncertainty and fear arising from the belief that there is only so much work to be done have resulted in the imposition of a wide variety of harmful restrictions upon efficiency, particularly on the part of labor. Each worker nurses his job, whether he be a union man or nonunion. In the case of union members, restrictions to spread the work or to maintain traditional methods take tangible form and are written into agreements or working rules of the unions. There are rules which limit the supply of labor by imposing rigid apprenticeship regulations and entrance requirements;¹³ rules which require that skilled tradesmen do unskilled work, such as carrying materials from truck to place of use. In Memphis, an agreement between the contractors and painters requires that no contractor shall employ laborers to wipe up paint on any job.¹⁴

Other union rules prohibit or restrict the installation of shop fabricated materials. In Butte, Mont., for example, carpenters are not allowed to install door jambs that are mortised for locks or hinges at mills or shops, nor to install window or door frames that have been previously assembled, unless the fabrication was done in a local shop.¹⁵ In Baltimore and Pittsburgh, agreements between the plumbers and contractors state that plumbers will not install any fixture on the job if trimmings are already in place until the trimmings have been removed and replaced by members of the union.¹⁶ In Houston, the 1938 working rules of the plumbers stated that "no piping which is prefabricated for installation in a particular place in any certain job will be installed by members of Local Union No. 68, unless thread is cut off of one end of pipe and new thread is cut by members of Local Union No. 68."¹⁷

Rigid jurisdictional distinctions in the building trades are in general also traceable to this belief that there is only a limited amount of work to be done. Each trade regards the right to perform a particular type of work as a property right, and carefully protects the methods and tools of its trade. Division of work among the trades in the building industry is not determined upon the basis of efficiency, as in manufacturing, but according to superior bargaining position. If two unions claim a particular type of work, the stronger will usually get it. If they are approximately equal in strength they may compromise and divide the work between them, as was done in the case of Acoustone, where the Operative Plasterers and Cement Finishers International Association, and the Bricklayers, Masons, and Plasterers International Union agreed to install the material on a "50-50 basis," equally divided between the members of the two unions.¹⁸

Unions are almost unanimous in prohibiting piece work, or the introduction into the building industry of any other techniques of scientific management which have greatly increased productivity and lowered costs in many of the leading manufacturing industries. Members are, in many cases, not permitted to make daily reports

¹³ See "Exhibit No. 21," appendix E, p. 194.

¹⁴ Agreement between Brotherhood of Painters, Decorators, and Paperhangers, Local 49 and the Contracting Painters of Memphis.

¹⁵ Working rules of the United Brotherhood of Carpenters and Joiners, Local 112, Butte, Mont.

¹⁶ See "Exhibit No. 22," appendix E, p. 195.

¹⁷ Working rules of the United Association of Journeymen Plumbers and Steamfitters Local No. 68, adopted September 1937.

¹⁸ Report of Proceedings of the Thirty-Third Annual Convention, Building and Construction Trades Department, American Federation of Labor, 1939, p. 46. See "Exhibit No. 23," appendix E, p. 195.

showing the amount of work done in a day. In Los Angeles, the 1937 working rules for the carpenters required that "any member found to be excessively rushing shall be reported by the steward, and if found guilty, be ruled off the job."¹⁹

Whether or not the above and similar rules are rigidly enforced is not known. The fact that such rules exist at all, and that they are in many cases written into contract agreements, indicates that they have considerable significance as restricting factors in the industry. They are expressions of a doctrine which has kept the building industry in an obsolete, disorganized condition.

Management.—Throughout its operations the building industry has failed to adopt efficient methods of management. In many manufacturing industries it has been clearly demonstrated that scientific management can more than double productivity, permitting at the same time greatly increased wages and lower total costs. In fact, scientific management has probably exercised as much influence in reducing costs in the manufacturing industries since 1900 as has increased mechanization. Yet, with very few exceptions, its techniques have never been applied to the building of houses.

The possibilities for cost reduction through scientific management are illustrated by results obtained from its application upon a large housing project in France. From 1920 to 1937, the Michelin Low-Cost Dwelling Corporation built houses for more than 3,000 employee-families of the Michelin Tire Factories at Clermont-Ferrand. In 1920, 11,643 working hours were required to build a house. In 1937, only 5,548 were required, or less than half. In 1920, the construction foreman and labor supervisors were responsible for preparing and organizing the work, such as building up working gangs, providing them with material, selecting the tools to be used, choosing the labor methods to be utilized, and determining the time to be allowed for each job. After 1920, a planning department was set up, and all the functions of preparation and organization of the work were turned over to its engineers.²⁰

In America, the few experiments which have been tried in the application of scientific management to the building of houses have shown remarkable savings. In a housing project near Baltimore, built under the engineering direction of the Thompson & Lichtner Co. of Boston, a planning department was set up to plan the details of measuring, most economical spacing, scheduling materials, and interlacing of the various trades. Actual time reductions on carpenter operations were achieved on this project ranging from 25 to 36 percent.²¹ Also, in a project of 30 houses built by the Southwest Portland Cement Co. in California for its employees, production time was greatly reduced through adequate planning and production standards. Electric wiring, for example, required only one-fourth as much time on the last house as on the first. Excavating required 27 percent as much time on the last as on the first. To build the entire basic structure of the house required less than half as many man-hours on the thirtieth house as

¹⁹ Working rules of the Los Angeles District Council, United Brotherhood of Carpenters and Joiners of America, adopted March 30, 1937.

²⁰ Special Report No. 185 to Department of Commerce, by Lestrade Brown, Assistant United States Trade Commissioner, Paris, France, February 2, 1937.

²¹ System Can Cut Building Costs, Sanford E. Thompson and W. E. Curley, *Nation's Business*, January 1939. See "Exhibit No. 24," appendix E, p. 195.

on the first. These savings were achieved by planning each element of the work in advance, dividing the workmen into small crews, giving each crew limited and repetitive operations to perform, and maintaining a constant check upon the time required to complete each part of the house. No time was wasted by the workmen in making decisions. Their functions were limited to the actual performance of the work.²²

On the ordinary building job, it has been estimated that more than 25 percent of the average craftsman's time is spent in making decisions as to his next move. Each operation offers a new problem to be solved. Its proper solution depends very largely upon the skill and training of the individual craftsman. There are no production standards. Although time studies were made for many of the building operations as early as 1900, following the principles of scientific management, they have had practically no influence in the industry. In 1923 the Bureau of Labor Statistics conducted a survey of labor productivity and costs in several of the building trades. In this report it was stated that the Bureau was unable to find a single contractor in the 15 cities visited who had a record of work done per man-hour on any job in progress, or upon any former job, and that the men coming in direct contact with building work had very little interest in the time costs by occupations or trades in the building industry.²³ Since 1923, scattered time estimates have been published in various building estimators' handbooks, but they are based largely upon guesswork.

The above study developed several significant facts concerning the wide differences in output in different localities which serve to emphasize the need for accurate production standards in the building industry. For example, the number of bricks laid per hour upon similar jobs varied from 96 in Indianapolis to 241 in Birmingham. The cost of laying 1,000 bricks in Birmingham was slightly less than \$5 and in Indianapolis was almost \$15. The average wage rate in Birmingham was \$1.16 and in Indianapolis \$1.37, but the greater part of the difference in cost was caused by the difference in productivity. In plastering, square yards plastered ranged from 4½ in Boston to almost 8 in Philadelphia. Unit costs of plastering were even more striking than in the case of bricklaying. Despite an hourly wage of \$1.64 in Philadelphia, as compared with a wage of \$1.44 in Boston, the cost of plastering a square yard was 21 cents in Philadelphia and 33 cents in Boston.

Early in the century, Frank B. Gilbreth, a former bricklayer by trade, showed clearly what can be gained through the use of scientific methods in the building trades. After a careful analysis of all bricklaying operations and motions, and by proper placement of equipment and elimination of useless motions, he was able to reduce the necessary motions in laying bricks under standard conditions from 18 to 5. On a large brick building, men using his new methods averaged 350 bricks per man per hour, whereas the average speed in that section of the country was 120 bricks per hour.²⁴

Both management and labor are responsible for the obsolete management methods which persist in the building industry. Contractors cling to the traditional viewpoint that bricklaying and carpentering,

²² Architectural Forum, March 1939. See "Exhibit No. 25," appendix E, p. 196.

²³ Productivity in Certain Building Trades, 1923, Ethelbert Stewart, Monthly Labor Review, Bureau of Labor Statistics, November 1924, pp. 1-15.

²⁴ Principles of Scientific Management, Frederick W. Taylor.

for example, are such old occupations that their methods cannot be improved upon. Even upon large scale housing projects, management consists principally in bringing the various elements together, under a brokerage arrangement, permitting each to plan, supervise, and perform its own particular operation. Modern engineering science has only rarely been applied to the production of houses.

Labor has generally opposed the use of scientific management in the building trades, just as it opposed its introduction into the manufacturing industries early in the century. In the manufacturing industries, labor has come to recognize that increased productivity holds the key to higher wages and lower prices, but in the building trades the old philosophy of limitation of output prevails.

Scientific management is as necessary for cost reduction in the building of houses as in the manufacturing of automobiles, radios, steel, or any other commodity. Its practicability, and cost-saving advantages, have been clearly proven on the building projects where it has been tried. There are limitations to its use in the building of isolated houses. Its principal savings can be gained upon larger housing projects. It offers a method of handling either existing or entirely new materials more efficiently on the job, with substantial savings in time and cost.

Standardization.—A further important reason for excessive building costs is the fact that houses are built to individual specifications, even in the essential elements. There is little standardization of materials or dimensions. Room heights, wall thicknesses, window and door openings, room lengths and widths vary sometimes by fractions of an inch, and almost every item of material used in the production of a house can be purchased in several sizes. The wide variation in sizes and use of fractional dimensions does not add to the individuality of houses, but very seriously limits the possibilities for mass production of materials, requires the carrying of large inventories, results in confusion, and seriously interferes with the introduction of mass production methods in the building industry.

One manufacturer lists as stock, ready for delivery in its regional warehouses, 82 different kinds and sizes of double-hung windows alone. Even bricks come in different sizes, although the National Bureau of Standards has greatly reduced their number in recent years. Before simplification by the Bureau, for example, there were 75 different varieties of brick. The Bureau recommended that these be reduced to two. Before simplification there were 1,114 different varieties of brass lavatory and sink traps. These were reduced to 76. There were more than 1,200 sizes of slate roofing. After simplification, there remained more than 300, despite a 75-percent reduction in number of sizes. In the case of wooden window frames, the Bureau of Standards found several years ago that it was virtually impossible to effect any reduction at all in the large number of sizes because of the wide regional differences in architectural styles.²⁵

As an indication of the savings which might be achieved through standardization of dimensions and sizes, steel stairs bought in quantities for the Clairton Colonial Village project near Pittsburgh cost \$22 per flight in contrast with the estimate made by the manufacturer of \$75 for one individual flight.²⁶ This type of standardization has no

²⁵ Letter Circular LC-504, National Bureau of Standards, September 3, 1937.

²⁶ Industrial Standardization and Commercial Standards Monthly, American Standards Association, August 1939, p. 210.

effect whatsoever upon appearance or utility. It has been clearly demonstrated by the Modular Service Association and by the Homasote Co. that any number of house plans and styles can be designed upon modular dimensions, using 4 inches as the smallest unit of measurement instead of fractions as at present. From actual experience in directing the construction of a large number of houses, the Homasote Co. estimates that modular design has resulted in a net saving of approximately 10 percent.²⁷ The ultimate savings through standardization would undoubtedly be considerably greater upon its application throughout the building industry to both materials and architectural dimensions. Room heights, for example, could be standardized, permitting mass production of stairways and wall panels. Room lengths and widths could be in multiples of a standard unit, permitting the use of larger units of material than bricks.

The American Standards Association, representing some 75 national trade associations, technical associations, and the Federal Government, has recently adopted a broad program directed at the standardization of building dimensions and sizes of building materials. As a result of a request made by the Modular Service Association early in 1938, the American Standards Association established the Committee on Coordination of Dimensions of Building Materials and Equipment. This is the first time an industry-wide approach has been made to the problem of standardization in the building industry, and it offers considerable possibilities for success. The committee represents almost every group interested in building, including manufacturers, architects, contractors, dealers, Government agencies, and architectural schools. Subcommittees have already begun studies of masonry, wood doors and windows, metal windows, and a committee has been authorized to undertake studies of structural wood and lumber construction.

Coordination.—As has previously been indicated, the building industry is made up of many separate and independent groups. Each group is organized as a business in itself. Each performs its special function with little relation to the others. There is no over-all management, and no effective coordination of the various elements participating in the production of houses.

Every effort at simplification or improvement of the production process meets with vigorous opposition on the part of one or more of these independent groups into which the industry is divided. One of the more common types of opposition may be illustrated by several cases which have come before the Federal Trade Commission in recent years in which retail dealers have organized to force all building materials through the established retail channels. In such a case, for which a cease and desist order was issued late in 1937, retail dealers controlling a large part of the sales of building materials and supplies in more than 30 States had organized specifically to force the distribution of building materials exclusively through the recognized retail dealers.²⁸ Similar organizations were found to control a large part of the market in California and Florida, and cease and desist orders were issued by the Commission in 1938.²⁹ All of these dealer associations

²⁷ Ibid.

²⁸ In the Matter of Building Material Dealers' Alliance et al., before the Federal Trade Commission, December 30, 1937. See "Exhibit No. 26," appendix E, p. 196.

²⁹ In the Matter of California Lumbermen's Council et al., July 23, 1938; and In the Matter of Florida Building Material Institute, Inc., September 10, 1938, before the Federal Trade Commission.

had as their primary purpose the prevention of direct sales of building materials by manufacturers or wholesalers to consumers, nonrecognized dealers, contractors, and Government agencies. Boycotts or threats of boycott were employed successfully against manufacturers who refused to cooperate.

Special-trade contractors often practice similar restraints upon distribution by requiring that their contract include both installation and furnishing of materials. Labor sometimes cooperates by refusing to work for contractors who do not furnish their own materials.

It is little wonder, with such restrictions prevailing, that building materials are for the most part purchased in small quantities from the local hardware store or lumber yard. The mere fact that such restrictions exist would indicate that considerable pressure has been exerted from time to time by contractors and other groups to simplify the distribution process.

The effects of the present roundabout distribution system are perhaps best illustrated by comparison with the automobile industry. Costs of producing automobiles would be tremendously increased if all materials from which cars are made were purchased through local retail dealers. The local dealer has not been eliminated in the automobile industry; in fact, in 1935 more people were engaged in the local distribution of new automobiles than in the retail distribution of building materials.³⁰ But the automobile dealer performs an entirely different function than does the building materials dealer. He is engaged in distributing a finished product ready to be driven away. Carburetors, glass, motors, sheet metal, and the other parts and materials from which automobiles are made are distributed in the most direct manner possible, from manufacturer to manufacturer.

Similar opposition to change or improvement persists among almost every group connected with the building industry. Manufacturers often refuse to sell their products to groups representing new methods of sale or new price policies. Sometimes they exercise their patent privileges to control unpatented products also. Contractors combine to keep all work for member contractors, and secure agreements whereby labor refuses to work for contractors who are not members of the association. Contractors also combine to prevent competition from out-of-town contractors, and to prevent the use of prefabricated materials. Legislative bodies, both State and local, assist in many of these restraints by requiring licenses for contractors, by prohibiting the use of out-of-State materials, and by inserting rigid and unnecessary requirements in local building codes.

An encouraging development has occurred in the last year which offers considerable promise for removal of many of the more wasteful of these restrictions. Under the antitrust laws, the Department of Justice has undertaken a broad program of investigation and prosecution covering all groups in the building industry in selected cities throughout the country. Indictments have already been returned in a number of these cities involving such restrictions as the fixing of prices by materials suppliers, control of bids by contractors, sale of materials only to selected companies, jurisdictional disputes between labor unions, and so forth.³¹

³⁰ Census of Business, 1935, Retail Distribution, vol. 1, p. 2-04, Bureau of the Census. See "Exhibit No. 27," appendix E, p. 200.

³¹ See "Exhibit No. 28," appendix E, p. 200.

Some effect upon building costs has already been noted by the Department as a result of this program. Other immediate savings will undoubtedly come as the program progresses. More important than the immediate savings, however, is the effect which the program can have in removing many of the hazards to experimentation into new methods and new materials for building low-cost houses. Such a program, if continued on a permanent basis, is also one of the most effective ways to insure that the savings from improved techniques will be rapidly passed on to the consumer in the form of lower housing costs.

Organization of the building industry into many separate businesses has created a condition in which no single group acting alone is able to exercise much influence over costs, either in lowering or raising them. Removal of restrictive practices, lowering of prices, or reduction in wages of any single group would have little effect upon costs, and would serve only to place that particular group in a disadvantageous position. No single element in the industry is strong enough to assume leadership.

Tradition.—Tradition has played a much more important part in the building of houses than in the production of other commodities. The public has demanded complete individuality in design, not only in general appearance and plan, but in small details such as window and door sizes, room heights, and many others which have little effect upon appearance or utility. Moreover, contractors, laborers, real-estate men, manufacturers, architects, and the general public alike have refused to believe that the age-old methods of building houses on the site, piecing small units of material together, layer on layer by hand, can be improved upon. The importance of this psychological influence should not be minimized, because it has bound the house rigidly to its site and discouraged experimentation. It has seriously interfered with the introduction of new materials, and has taken tangible form in the restrictions upon new methods and materials imposed by building codes, lending policies, and so forth.

Industrial research.—Finally, and most important, the building industry has fallen far behind other industries in respect to scientific industrial research. There has been little effort to develop in the research laboratory methods of building or improved materials for the house as a complete unit. As will be developed in the following section, scientific research directed at the development of entirely new building materials and methods, the improvement of existing materials, and the perfection of scientific production management techniques offers the greatest immediate promise for substantially increasing productivity throughout the building industry, thereby reducing costs to the levels necessary for adequate housing in America and sound expansion in the building industry.

NEED FOR SCIENTIFIC INDUSTRIAL RESEARCH

In the building industry, industrial research aimed at the development of low-cost houses has been almost entirely neglected. Contractors operate upon too small a scale to carry on research. Manufacturers of building materials often maintain research laboratories but are interested only in the development of their own products, and no single manufacturer produces a very large proportion of the materials used in a house. Gypsum companies, for example, manufacture

only such things as plaster boards and plaster. Brick companies specialize in brick. No single manufacturer is interested in the house as a whole, and none of them has been willing to spend money upon industrial research of a comprehensive nature.

In recent years a few companies, commonly referred to as prefabrication companies, have attempted to develop processes by which complete houses or their component parts might be manufactured by one company in a central plant and shipped to the site. A considerable number of houses have been produced and sold by these companies. For the most part, however, the prefabricators have merely transferred traditional methods of layer and piece construction into a central factory upon the theory that the same building operations could be more efficiently performed at a central location. Direct labor has simply been changed to indirect. Little effort has been made to reduce substantially the number of handling operations through the development of entirely new materials or methods. Because of the tremendous weight and size of houses, the cost of transportation from factory to site has very largely offset any savings achieved by this method of centralized production, and the market area has been greatly restricted. Moreover, traditional materials do not lend themselves well to factory assembly, and the appearance of prefabricated houses has not met with public approval. The prefabrication companies have, however, made valuable contributions by considering the house as a complete unit and by developing a panel system of construction. The panels are usually room height and wall thickness, and are composed of various materials such as steel or wood frame faced with plywood or asbestos board. The companies have not had extensive funds for research into new materials, and their efforts will serve principally as the starting point for further efforts in this direction.

Several Federal agencies have engaged in housing research from time to time, but on a relatively insignificant scale. The Forest Products Laboratory, for example, has conducted a limited amount of research upon the development of new uses for wood in low-cost housing, and through a small program has achieved remarkable results in the development of an improved plywood and system of panel construction. The National Bureau of Standards is at the present time engaged in testing various construction systems developed by private companies. The Farm Security Administration has developed cost-saving systems of panel construction for farm buildings. But, with these few exceptions, Federal agencies have not conducted research into new methods and materials for building low-cost, quality houses.

In contrast with the almost complete disregard for the importance of industrial research in the building industry, the leading manufacturing industries have long recognized that cost reductions and quality improvements are usually a direct result of laboratory investigation. Among the industries which maintain the important laboratories are the leading industries in America, such as the chemical, petroleum, automobile, rubber, iron and steel, machinery, agricultural implements, electrical and radio industries. Largely as a result of this type of research, low-priced automobiles, radios, refrigerators, food, and other commodities have been made available. Estimates of the total amount spent each year by private companies for industrial

research range from \$100,000,000 to as high as \$200,000,000 or more.¹

The possibilities for rapid progress in the direction of reduced building costs through an adequate program of industrial research are extremely favorable. Several authorities have estimated that it may be possible by this method to reduce costs by as much as 50 percent without lowering standards of quality.² New machinery can be developed to displace many of the handicraft methods of assembly, Engineering studies can be made to establish reliable production standards for each craft and to determine the most efficient method of performing each operation. Suitable schedules and planning techniques can be worked out for application by the contractor or building concern. Structural dimensions and sizes of building materials can be standardized. Perhaps the greatest opportunities, however, are in the investigation of entirely new materials and methods of building.

Traditional site construction and lack of standardization have ruled that houses should be built of countless small units of material, which do not lend themselves readily to efficient assembly, either on the site or in a central prefabrication plant. Wood requires measuring, cutting and fitting. Bricks are exceedingly small and must be placed by hand.

Moreover, existing materials must be assembled layer upon layer, because no single material has been developed which will fulfill more than a few of the functions required of a composite structural part, such as a wall or floor. For example, the outside wall of an ordinary frame house is made up of some 10 or more individual layers of material, such as framing, sheathing, water-proof paper, siding, insulation, lath, three coats of plaster, interior finish, and several coats of paint on the outside. Each layer performs a distinct function and requires separate and costly handling.

It should be possible within a reasonably short period of time under an adequate program of laboratory research to develop a building material which would greatly reduce the necessity for layer and piece construction. The required research is largely that of the application of principles and materials which have been developed in other industries. For example, in the field of plastics, complete wings and fuselages for aeroplanes have been produced using synthetic resins, both in this country and abroad. Although still in the experimental stage, several companies have already organized for production. Automobile manufacturers are said to be interested in the possibilities of molding complete automobile bodies by a similar process.

Production in plastics is based upon the principle that one fabricating operation produces a finished part. Whether plastics can be adapted to the manufacture of large panels or sections for use in low-cost housing is not known. That is a problem for the laboratory. The production principle upon which use of plastics is based, however, illustrates the approach which should be followed in developing a more satisfactory building material. The aim should be to reduce handling and tooling operations, and to combine multiple functions

¹ Research—A National Resource, National Resources Committee, December 1938; Maurice Holland, *Dun's Review*, December 1938; *Christian Science Monitor*, January 1, 1940, reporting estimate by William A. Hamor. See "Exhibit No. 29," appendix E, p. 202.

² Robert L. Davison, Director of Housing Research, John B. Pierce Foundation, Hearings before the Temporary National Economic Committee, Part II. Report of the Correlating Committee on Technological Developments, President's Conference on Home Building and Home Ownership, 1931. See "Exhibit No. 30," appendix E, p. 204.

into a single material. Development of such a material would do much to accomplish the purpose of reducing man-hour requirements in the production of houses, which, as previously stated, is the only effective way of substantially lowering building costs.

The ideal material for greatest efficiency in the building of houses should possess the following qualities:

1. It should be light in weight.
2. It should be structurally strong.
3. It should be durable.
4. It should be fire resistant.
5. It should be moisture, weather, and sound proof, and should have a low rate of expansion.
6. It should lend itself readily to molding in large panels or sections.
7. It should be easily bonded together to present either a smooth or broken finish.
8. It should have permanent exterior and interior finishes in a variety of colors molded into the units as integral parts of the material.
9. It should be adaptable to assembly in either traditional or modern design.
10. It should be inexpensive to produce in large quantities, and available throughout the country.

Regardless of whether or not it is possible through research to develop a single material which will fulfill all of the above requirements, it is certain that materials could soon be developed which would appreciably reduce the necessity for costly layer and piece construction.

Methods of assembly could also be greatly improved by laboratory investigations. Careful engineering analysis of the most efficient methods, tools, and machinery for each building operation, the establishment of scientific production standards, and the development of new systems offer considerable possibilities for reduced costs either with existing or new materials. Systems of panel construction have been developed by several prefabrication companies which offer an important basis for further research. They effectively demonstrate that it is possible to build houses of larger units of material than bricks or shingles. Although the necessity for layer and piece construction has not been overcome in these systems, they have done much to point the way to an efficient method by which houses of many designs can be assembled from large panels which are prepared in a central plant. The principal requirement again is for the development of a satisfactory material for molding which will have the multiple characteristics enumerated above.

Comprehensive industrial research in housing is closely related to the restrictive practices which prevail throughout the building industry, some of which have been discussed in this report. Many of these practices will require direct attack by methods such as are now being employed by the Department of Justice. The wide prevalence of restrictions, however, suggests the possibility that in general they are results rather than causes of the technological backwardness of the building industry, and could in large part be most successfully overcome through the type of industrial research referred to above.

For example, if materials and methods were developed in the laboratory by which quality houses could be produced and offered for sale at approximately half their present cost, a great majority of the restrictive practices would disappear through pressure of public demand. This cannot be accomplished by the improvement of details such as wallboard, roofing, or furnaces. It can only be done through comprehensive research upon the house as a unit. Restrictions imposed against the automobile by the carriage and wagon makers, for example, could not have been overcome simply by the development of a better carburetor; they became completely ineffective, however, when Ford developed a complete low-priced car.

Because of the organization of the building industry into many small and independent concerns, and because of the traditional viewpoint which prevails, there is little likelihood that the type of research which is needed will be undertaken by private companies, unless a large concern, disassociated from the industry, should interest itself in the problem of low-cost housing and should be willing to set aside several million dollars for the necessary laboratory work.

In its capacities for comprehensive research into new methods and materials, the building industry is similar to agriculture. It is organized into many small and independent enterprises, no one of which is in a position to spend money for research or to take a broad view of the technological problems of the industry as a whole. In agriculture the Federal Government has for many years conducted the essential laboratory work. A total of more than \$20,000,000 was appropriated annually by Congress for this purpose during 1937 and 1938. In the building industry neither the Government nor private industry has assumed responsibility for industrial research, and to this fact may be attributed, more than to any other single thing, the present inefficiency of the building process, the disorganization of the building industry, and the excessive cost of housing.

RECOMMENDATIONS

It has been pointed out that some reductions in housing costs could be effected through the lowering of such money charges as wages of building craftsmen and prices of building materials. The first is made difficult because no one is in a position to guarantee labor steady employment, since employment is almost as uncertain for the contractor as for labor. The second is complicated by the fact that the materials which are manufactured or supplied by any one company represent but a relatively small proportion of the materials used in a house, and price reductions by a single manufacturer or group of similar manufacturers would simply place them in a disadvantageous position and have little effect upon the cost of building. Moreover, when new houses can be built for but a very small percentage of the highest income families in America, more substantial reductions in costs are necessary than can be achieved through the adjustment of prices, wages, and fees.

It has been emphasized that the philosophy of limitation of output prevails throughout the building industry. Manufacturers restrict output to keep prices high, just as labor restricts it by limiting, either directly or indirectly, the amount of work done. The conclusion has been drawn that until productivity throughout the industry is greatly

increased by the development of more efficient methods and materials through scientific industrial research, housing costs will remain high. Also, that unless productivity is increased in the production of houses to balance the steady increases in efficiency in other industries, standards of housing will steadily decline in relation to the general standard of living, or rents will consume a larger and larger proportion of the family budget.

Labor is particularly injured by the inefficiency of the building industry, not only because the resulting high costs limit demand and cause serious unemployment, but because labor is the principal consumer and most affected by high rents.

Because of the importance of low-cost housing, both to national recovery and to improved living conditions, it is highly important that several specific steps should be taken by the Federal Government to secure the immediate reduction of building costs. Each of these steps is based upon the principle that the provision of adequate housing is an undertaking for private enterprise, but that the Federal Government should assume responsibility for actively assisting in every way possible to develop methods and procedures by which building costs may be reduced to levels which will insure adequate shelter for every family in America.

It is recognized as extremely important that in such a program of active assistance by the Federal Government, guarantees should be provided whereby any reductions in cost resulting from increased efficiency through technological improvement will be immediately passed to the consumer in the form of lower ownership costs rather than accumulated as higher dividends, profits, or wage rates which tend to increase purchasing power of but a relatively small group of consumers.

It is recommended:

1. *Industrial research*.—That adequate funds should be provided by Congress to a specially designated group for the initiation and coordination of comprehensive laboratory research directed at the immediate development of materials and methods for low-cost housing.

The central group might be organized similarly to the National Advisory Committee for Aeronautics. It should be given complete freedom in its search for improved materials and methods. Subjects for investigation should include standardization of materials and dimensions, scientific production management, mechanization of building operations, and new materials.

Existing facilities of the National Bureau of Standards, the Forest Products Laboratory, and the Agricultural Experiment Stations should be utilized for actual laboratory work where possible.

The Federal Government should assume responsibility for technological research in the building industry as it has done in agriculture and aviation. Only through such a program of intensive laboratory research can the costs of housing be substantially reduced within a reasonable period of time.

2. *Scientific management*.—That every effort should be made by the Federal Housing Administration, the United States Housing Authority, the Department of Commerce, and the Department of Labor to encourage the introduction and use of

scientific management methods upon housing projects, both public and private. That the detailed study of building operations and the preparation of production standards for each craft and type of work in the residential building field in representative localities should be included as an essential part of the comprehensive research program recommended above.

3. *Standardization.*—That until an adequate program of industrial research is provided, active encouragement should be given to the National Bureau of Standards and the American Standards Association in the standardization of building materials and structural dimensions. That this activity should be included as an essential part of the comprehensive research program recommended above.

4. *Restrictive practices.*—That the investigation and prosecution of restrictive practices should be continued upon the present basis by the Department of Justice, with effort made in each instance not only to prosecute but to point out to the parties involved legitimate and efficient methods of performing their respective functions in the building industry. That such affirmative assistance should be provided through close cooperation between the Department of Justice and the several Federal housing agencies.

5. *Building codes.*—That, under the leadership of the Department of Commerce acting through the National Bureau of Standards, standard building codes should be formulated for residential construction in the various regions into which the United States is naturally divided. That until such ideal codes have been devised, methods of direct attack should be adopted by the Federal Works Administration, the Department of Justice, the Federal Housing Administration and the Office of the Defense Housing Coordinator to secure revisions of the most serious restrictions contained in existing codes in the larger cities.

It is recognized that many other steps might be taken by the Federal Government toward promoting expansion in the building industry through reductions in costs, but the five recommendations listed above, if carried out actively, would bring rapid reductions in housing costs without subsidization or the lowering of building standards. Technological backwardness and low productivity are basically responsible for excessive building costs, and the most important single approach to the problem is through the immediate expansion upon an adequate scale of scientific industrial research under the leadership of the Federal Government.

Industrial research in this field is especially important in view of the present war emergency. When the United States entered the war in 1917, one of the more serious problems was that of inadequate housing in the industrial centers where new workers were drawn in large numbers to provide essential war materials. Serious labor turnover and threat of skilled labor shortages in these industrial areas were directly traceable to the lack of housing facilities. In many places skilled workers could not be retained even with high wages because of unsatisfactory living conditions. Labor turn-over mounted to as high as 360 percent a month in some plants. Efficiency was seriously affected. In 1918 the United States Housing Corporation was formed to alleviate the condition by building houses directly for the Federal

Government where the shortage was most serious. The Corporation had just begun to function effectively when the armistice was signed.

A similar housing emergency has already become apparent in many localities as a result of defense preparations. A Defense Housing Coordinator has recently been appointed to deal with the situation. It is important that concerted effort be made to reduce the money cost of housing and especially the time required to build, unless housing is to become a serious bottleneck in the production of defense essentials. Both the time cost and the money cost of housing can be reduced through the immediate expansion of industrial research aimed at the reduction of housing costs through increased productivity.

APPENDIX A

Table A. Comparison of net earnings and construction expenditures of the United States Steel Corporation—1904-38.

B. Income and operating expense per room per month, and operating and capital costs in relation to gross annual income, for 39 New York apartment buildings—1937.

C. Prices of five principal construction materials—1937.

TABLE A.—*Comparison of net earnings and construction expenditures of the United States Steel Corporation—1904-38*

[1925=100]

Year	Index of net earnings before depreciation	Index of new construction expenditures	Year	Index of net earnings before depreciation	Index of new construction expenditures
1904.....	44	25	1922.....	61	33
1905.....	72	34	1923.....	108	77
1906.....	94	45	1924.....	92	101
1907.....	97	95	1925.....	100	100
1908.....	55	70	1926.....	120	107
1909.....	79	53	1927.....	99	138
1910.....	85	75	1928.....	116	73
1911.....	63	70	1929.....	156	84
1912.....	65	29	1930.....	91	204
1913.....	82	60	1931.....	25	84
1914.....	59	33	1932.....	-11	11
1915.....	78	22	1933.....	7	14
1916.....	201	84	1934.....	18	14
1917.....	178	167	1935.....	32	50
1918.....	112	183	1936.....	71	108
1919.....	87	123	1937.....	95	(1)
1920.....	106	145	1938.....	34	(1)
1921.....	56	99			

¹ No data available.

Source: "Tabulated History of the United States Steel Corporation," Wall Street Journal, Oct. 4, 1937.

TABLE B.—*Income and operating expense per room per month, and operating and capital costs in relation to gross annual income, for 39 New York apartment buildings—1937*

Height of apartment building (in number of stories)	Rent per room per month	Operating expense per room per month	Percent of gross annual income				Percent profit or loss
			Operating expenses ¹	Taxes and assess- ments	Interest on mortgages	Vacancies	
5.....	\$7.13	\$2.42	33.9	15.7	16.4	3.1	+30.9
5.....	10.69	4.59	43.0	17.6	25.9	2.8	+10.7
5.....	11.53	3.87	33.6	10.2	15.2	9.0	+32.0
6.....	8.80	2.88	32.7	15.8	18.4	1.3	+31.8
6.....	11.33	4.25	37.5	15.1	21.5	.4	+25.5
6.....	6.24	2.83	45.3	10.7	17.6		+26.4
6.....	10.29	4.77	46.4	25.5	27.4	² 13.6	-12.9
8.....	17.22	7.36	42.7	24.7	57.4	5.5	-30.3
8.....	14.14	6.02	42.5	19.5	31.3	6.4	+3
9.....	21.70	10.80	49.7	27.2	20.8	9.0	-6.7
9.....	22.07	10.32	46.7	24.8	38.7	10.9	-21.1
9.....	27.18	11.26	41.4	21.7	27.1	1.3	+8.5
9.....	28.43	11.47	40.3	22.5	27.3	6.5	+3.4
9.....	28.86	13.13	45.5	21.6	30.9	6.4	-4.4
9.....	40.95	15.93	38.9	19.8	15.3	26.9	-9
10.....	15.16	6.70	44.2	17.1	28.4	10.9	-6
10.....	26.84	9.13	34.1	16.9	29.1	.6	+19.4
12.....	15.79	8.42	53.3	26.6	28.0	10.6	-18.5
12.....	21.15	12.05	57.0	24.9	43.9	5.7	-31.5
12.....	21.53	8.80	40.9	19.4	24.5	9.4	+5.8
12.....	21.69	10.87	50.1	25.1	40.5	9.9	-25.6
12.....	23.10	11.53	49.9	22.8	18.9	9.3	-9
12.....	30.29	12.22	40.3	22.9	29.0	5.2	+2.6
12.....	31.28	11.11	35.5	20.7	33.0	6.3	+4.5
13.....	30.29	12.46	41.1	23.0	29.2	5.2	+1.5
13.....	31.28	11.35	36.3	20.7	33.1	6.3	+3.6
14.....	22.71	8.76	38.6	20.3	22.6	7.9	+10.6
14.....	28.87	10.43	36.1	27.1	37.8	15.8	-16.8
15.....	22.71	10.43	45.9	26.5	34.6	7.6	-14.6
15.....	23.75	9.50	40.0	24.5	6.2	6.5	+22.8
15.....	23.93	8.74	36.5	19.0	22.4	10.1	+12.0
15.....	23.63	10.73	45.4	22.9	25.4	4.7	+1.6
15.....	24.72	10.09	40.8	27.0	45.1	2.1	-15.0
15.....	25.73	8.95	34.8	24.3	62.8	7.6	-25.7
15.....	26.44	8.65	32.7	24.4	34.0	6.6	+2.3
16.....	21.73	8.83	40.6	28.5	23.3	10.8	-3.2
16.....	28.41	11.17	39.3	21.8	10.0	4.8	+24.1
17.....	36.52	12.81	35.1	20.7	27.1	.9	+16.2
17.....	42.32	6.61	15.6	23.3	38.5	12.0	+10.6
Average (39 buildings)			40.6	21.6	28.7		

¹ Operating expenses include fuel, electricity, gas, pay roll, painting, repairs, supplies, telephone, advertising, legal, maintenance, insurance, management, water, brokerage, miscellaneous.

² Includes stores and apartments.

Source: Accounting and exchange committee, management division, the Real Estate Board of New York, Inc.

TABLE C.—Prices of 5 principal construction materials—1937

State	Lumber (440 board feet)		Cement (6 barrels)		Crushed stone or gravel (10 cubic yards)		Steel reinforcing bars (280 pounds)		Brick (800)		Total	
	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15
Alabama	\$11.00	\$9.24	\$11.52	\$12.00	\$19.50	\$19.90	\$8.65	\$7.62	\$8.70	\$7.63	\$59.67	\$56.39
Arizona	18.11	18.11						13.02				
Arkansas	11.00	11.00	12.95	15.36	16.00	16.00	9.80	10.28	9.00	9.00	58.76	61.64
California	13.55	16.17	10.50	10.50	20.02	10.70	7.36	7.36	7.00	7.20	58.43	55.19
Colorado	17.09	17.09	15.18	14.64	15.00	15.00	11.73	14.73	9.60	10.50	68.60	71.96
Connecticut			13.92	14.58	13.52	29.70						
Delaware	14.30	14.30	13.08	13.08	14.50	14.50						
Florida	13.80	11.75	11.40	12.00	12.10	16.10	6.83	6.33	6.60	6.60	50.73	53.28
Georgia	11.00	11.00	14.34	12.06	25.00	23.50	6.83	8.10	6.58	6.58	63.75	61.54
Idaho	13.06	13.06	16.98	12.00	12.00	12.00	12.43	12.43	6.00	6.00	61.13	61.13
Illinois	18.92	13.55	12.90	12.48	15.14	16.90	8.96	6.32	6.00	6.00	62.52	64.95
Indiana	17.16	15.40	13.98	12.30	12.30	15.00	9.32	9.32	9.30	9.30	62.68	63.20
Iowa	18.08	21.12	13.44	14.16	21.06	20.00	8.92	8.92				
Kansas	18.04	18.48	13.80	13.44			9.80					
Kentucky	13.20	13.40	14.16	13.56	15.00	17.50	9.07	8.57	8.40	8.10	59.83	63.13
Louisiana	15.13	11.48	13.56	12.90	19.40	21.40	7.53	7.22	9.00	9.14	64.67	62.14
Maine												
Maryland	13.20	10.92	11.52	13.08	14.00	14.50		10.64	9.00	9.60		58.14
Massachusetts	17.24	17.24	11.88	12.42	9.05	9.80		8.57	9.15	9.30		57.33
Michigan	17.25	14.74	10.56	10.50	16.66	18.60	7.39	9.24	9.39	9.40	61.25	62.48
Minnesota	14.96	14.52	15.00	15.00	14.00	14.00	8.68	8.68	9.90	10.80	62.54	63.00
Mississippi	11.00	12.10	14.70	15.48	15.90	15.90	8.54	8.54	6.30	6.30	56.44	58.32
Missouri	12.32	13.42	12.78	13.02	15.00	16.40	8.95	8.95	8.40	9.00	57.46	60.80
Montana	14.96	14.96	19.10	19.10	26.00	26.00	7.95	7.95	15.90	15.00	58.91	63.91
Nebraska		18.48	15.12	15.54				9.04		8.55		
Nevada	15.40	15.40	17.40	17.40		20.00						
New Hampshire			13.08	13.53	18.80	14.50						
New Jersey	18.96	16.13	12.60	11.23	15.30	13.90	6.58	7.53	7.58	6.88	61.02	55.69
New Mexico	13.20	13.20	19.08	19.08			8.96	8.96	6.00	6.00		
New York	18.73	18.73		11.55				8.86	6.90	6.90		58.57
North Carolina			15.30	15.21	28.90	27.04			8.70	8.70		
North Carolina			15.30	15.21	28.30	27.04						
North Dakota			16.55	18.66	29.25	26.25						
Ohio	13.64	17.16	12.36	13.32	17.60	14.00	8.40	8.32	9.60	16.20		89.59
Oklahoma	11.88	12.76	14.26	14.10	16.70	16.70	7.56	8.40	7.50	7.50	61.60	58.03
Oregon	14.11	10.68	14.40	14.10	17.15	16.90	6.83	7.56	9.50	9.50	57.90	63.46
Pennsylvania	16.72	15.40	12.66	13.20	15.80	16.90	9.46	8.85	8.40	88.40	60.89	55.71
Rhode Island									9.00	9.00	63.64	63.35
South Carolina			16.80	12.60	30.75	30.75						
South Dakota	10.19	10.19	14.54	14.88								

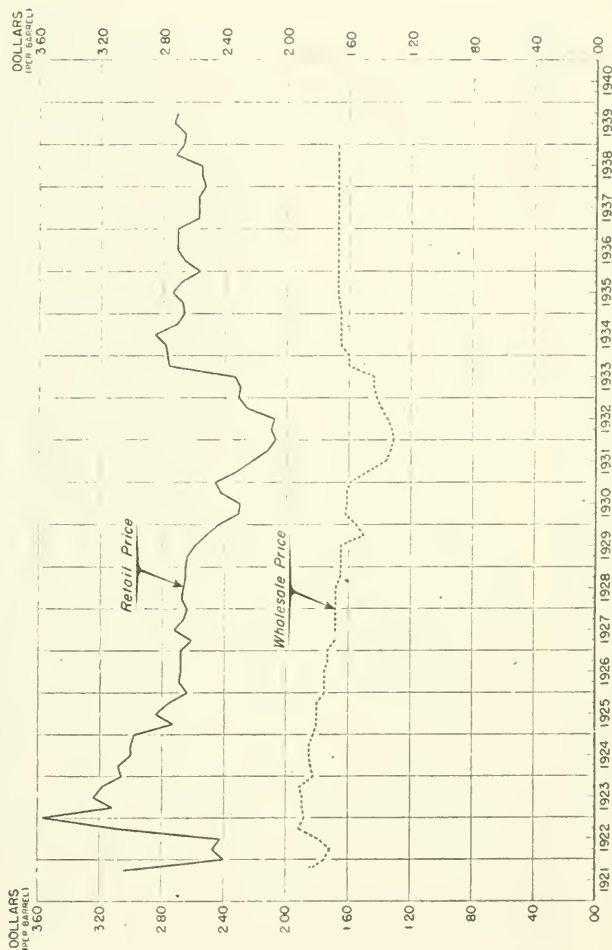
TABLE C.—Prices of 5 principal construction materials—1937—Continued

State	Lumber (440 board feet)		Cement (6 barrels)		Crushed stone or gravel (10 cubic yards)		Steel reinforcing bars (280 pounds)		Brick (600)		Total	
	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15	Apr. 15	June 15
Tennessee.....	16.50	12.32	15.24	15.18	15.37	15.37	7.08	9.34	8.25	8.25	62.44	60.46
Texas.....	16.28	16.28	14.04	12.90	12.00	12.00	9.57	8.57	6.04	6.00	57.93	55.75
Utah.....	21.34	18.80	17.40	16.80	-----	-----	9.54	14.00	7.80	8.10	-----	-----
Vermont.....	14.70	14.70	14.46	14.46	21.60	21.60	-----	-----	9.00	9.00	-----	-----
Virginia.....	10.56	9.20	17.28	19.80	21.20	19.60	6.83	6.83	8.40	10.50	64.27	65.93
Washington.....	-----	-----	12.42	13.32	26.00	26.00	-----	-----	8.40	8.40	-----	-----
West Virginia.....	17.16	19.36	15.00	14.58	17.50	18.75	8.99	8.74	7.65	8.70	66.30	70.13
Wisconsin.....	18.70	18.70	22.08	17.64	-----	-----	10.10	10.10	9.60	10.80	-----	-----
Wyoming.....	16.72	-----	14.10	-----	16.50	-----	-----	-----	-----	-----	-----	-----
District of Columbia.....	18.59	-----	10.98	-----	13.20	-----	6.39	-----	6.65	-----	56.31	-----
New York City.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Source: From field reports of the Works Progress Administration, 1937.

CHART I

RETAIL AND WHOLESALE PRICES OF PORTLAND CEMENT UNITED STATES, SEPTEMBER, 1921 - DECEMBER, 1938 & SEPTEMBER, 1939



SOURCE: RETAIL PRICE, L.C. DELIVERED - Bureau of Statistics, Division of Building and Housing, "Building Material Prices," July 1921 to June 1933. Code Authority for Builders' Supplies Trade Association, "Building Material Prices," March 1933. Compared by Construction Analysis Unit of WPA, based on building material prices reported by Engineering News-Record, June 1935 to July 1939. WHOLESALE PRICE, AVERAGE FOR 6 FIRMS, F.O.B. MILL - Bureau of Labor Statistics, Wholesale Price Division.

CHART II

RETAIL AND WHOLESALE PRICES OF SHORT LEAF YELLOW PINE

UNITED STATES, SEPTEMBER, 1921 & MARCH, 1926 - SEPTEMBER, 1939

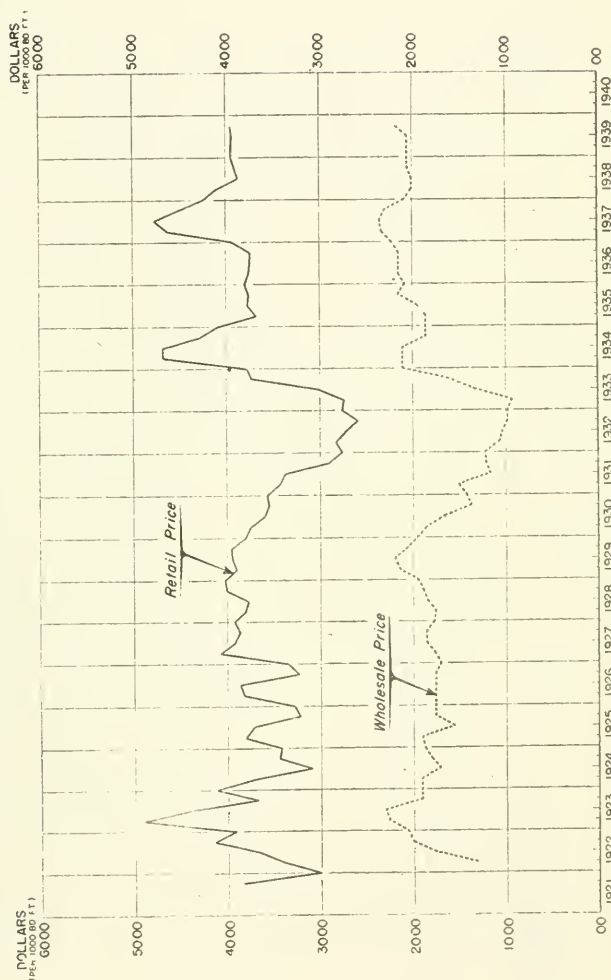


SOURCE: RETAIL PRICE, NO. 2 COMMON, 1" X 6", RANDOM LENGTH, L. C. L. DELIVERED, Bureau of Standards, Division of Building and Housing, "Building Materials Prices", Sept. 1921 to June, 1933, Code Authority for Retail Lumber and Building Materials Products Industry, Sept. 1933 to Dec. 1934, Reports to NRE, 1935 to 1939, based on Building Materials Prices Reported by Engineering News-Record, June, 1935 to Date.
 WHOLESALE PRICE, NO. 2 COMMON, 1" X 6", F.O.B. SHIPPING POINT, Bureau of Labor Statistics, Wholesale Price Division.

CHART III

RETAIL AND WHOLESALE PRICES OF DOUGLAS FIR

UNITED STATES, SEPTEMBER, 1921 & MARCH, 1922 - SEPTEMBER, 1939

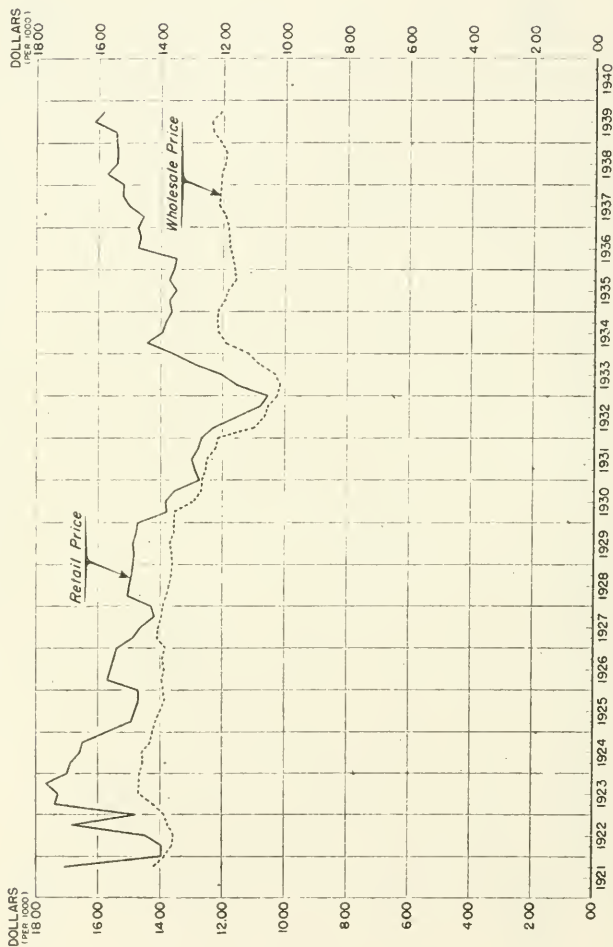


SOURCE: RETAIL PRICE, NO. 1 COMMON, 2" x 4" x 16', L.C.L. DELIVERED. Bureau of Standards, Division of Building and Housing, Building Material Prices, Sept. 1921 to June 1933; Cost Authority for Retail Lumber and Building Materials Products Industry, Sept. 1933 to May 1934; Reports to Data from Retail Lumber Dealers, March 1935; Computed by construction and/or 1/4 inch of B.F.F., based on economy segment prices available by Commerce Department, Bureau of Economic Warfare, 1935-1939. WHOLESALE PRICE, NO. 1 COMMON, 2" x 4" x 16', F.O.B. MILL; Bureau of Labor Statistics, Wholesale Price Division, 1921-1939.

CHART IV

RETAIL AND WHOLESALE PRICES OF COMMON BRICK

UNITED STATES, SEPTEMBER, 1921 - SEPTEMBER, 1939



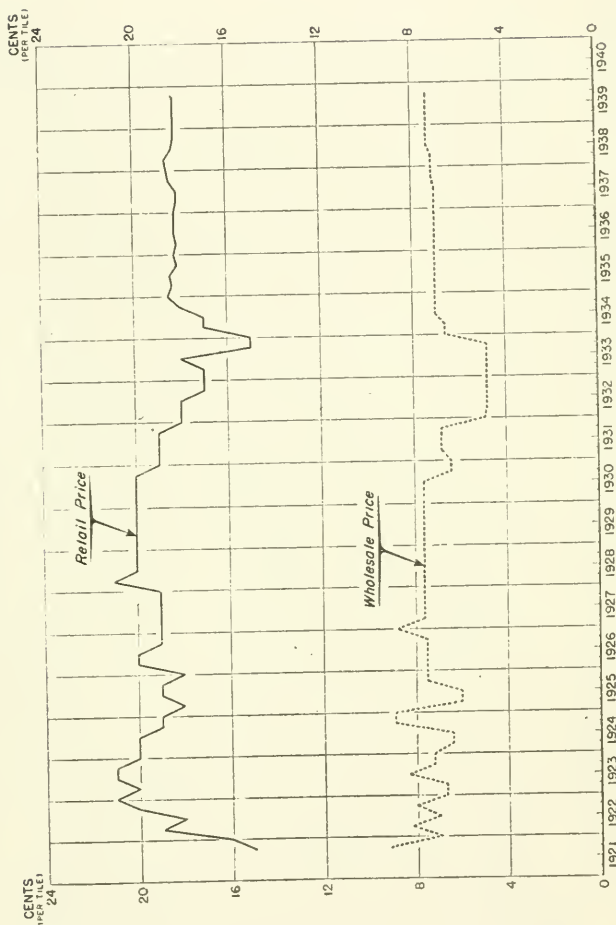
SOURCE: RETAIL PRICE, L.C.L. DELIVERED: Bureau of Standards, Division of Building and Housing, "Building Material Index," Sept. 1921 to June 1933. Code Authority for the Builders' Supplies Trade, Sept. 1933 to Dec. 1934. Reports to W.B.A. from Builders' Supplies Retailers, March 1935. Compared by Construction Analysts Unit of W.B.A. based on Building Material Index reported by Engineering News-Record, June 1935 to date.

WHOLESALE PRICE, AVERAGE OF 82 PLANTS CHANGED TO 50 PLANTS IN 1931: Bureau of Labor Statistics, Wholesale Price Division.

CHART V

RETAIL AND WHOLESALE PRICES OF HOLLOW TILE

UNITED STATES, SEPTEMBER, 1921 - SEPTEMBER, 1939



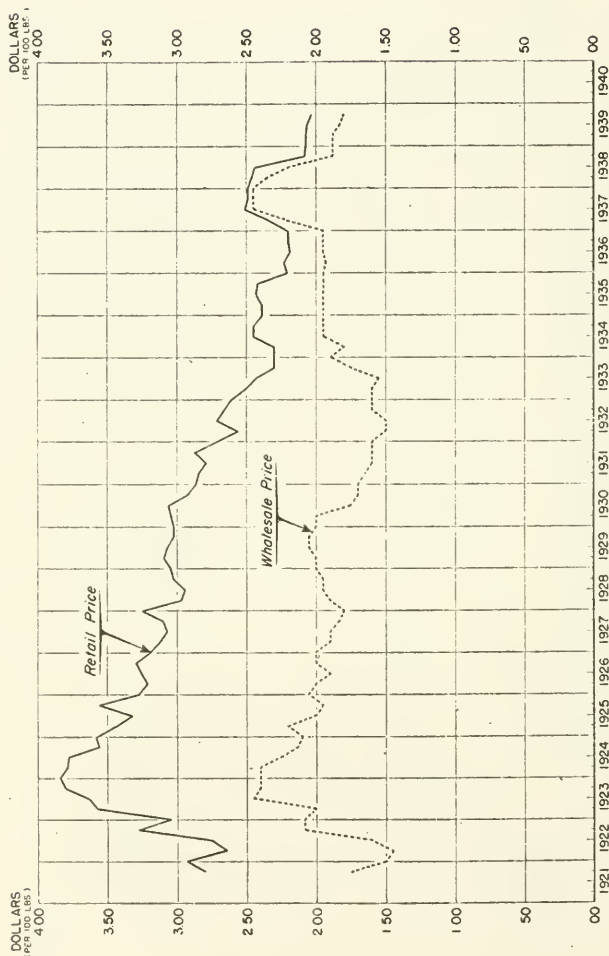
SOURCE: RETAIL PRICE, 8" x 12" x 12" L.C.L. DELIVERED. Bureau of Standards, Bureau of Building and Housing, "Building Material Prices," Sept. 1931 to June 1933; Code Authority for Builders Supply Trade, Sept. 1933 to Dec. 1934; Reports to BHA from Builders Supply Retailers, March 1935. Computed by Construction Materials Unit of WPA, based on building material prices reported by Engineering News-Record, June 1935 to date.

WHOLESALE PRICE, 4" x 12" x 12", % DELIVERED, CHICAGO. Bureau of Labor Statistics, Wholesale Price Division.

CHART VI

RETAIL AND WHOLESALE PRICES OF STEEL REINFORCING BARS

UNITED STATES, SEPTEMBER, 1921 - SEPTEMBER, 1939

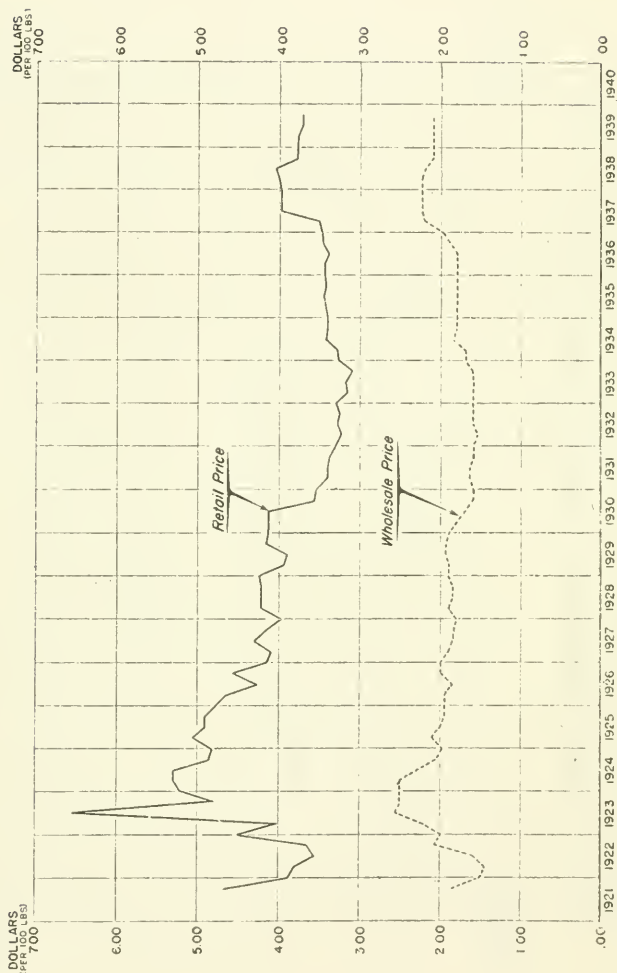


NOTE: RETAIL PRICE, NEW BULLET, 1/2 INCHES, ROUND, 1/2 DELIVERED. Wholesale Price, 1/2 INCHES, 1/2 DELIVERED. Source: Bureau of Standards, Division of Engineering and Research, Building Materials Prices, Sept. 1921 to June 1933; Code Authority for the Reinforcing Materials Fabricating Industry, Sept. 1933 to March 1935. Compared by Construction Statistics Section of WPA, based on building material prices reported by Engineering News-Record.

CHART VII

RETAIL AND WHOLESALE PRICES OF STRUCTURAL STEEL

UNITED STATES, SEPTEMBER, 1921 - SEPTEMBER, 1939



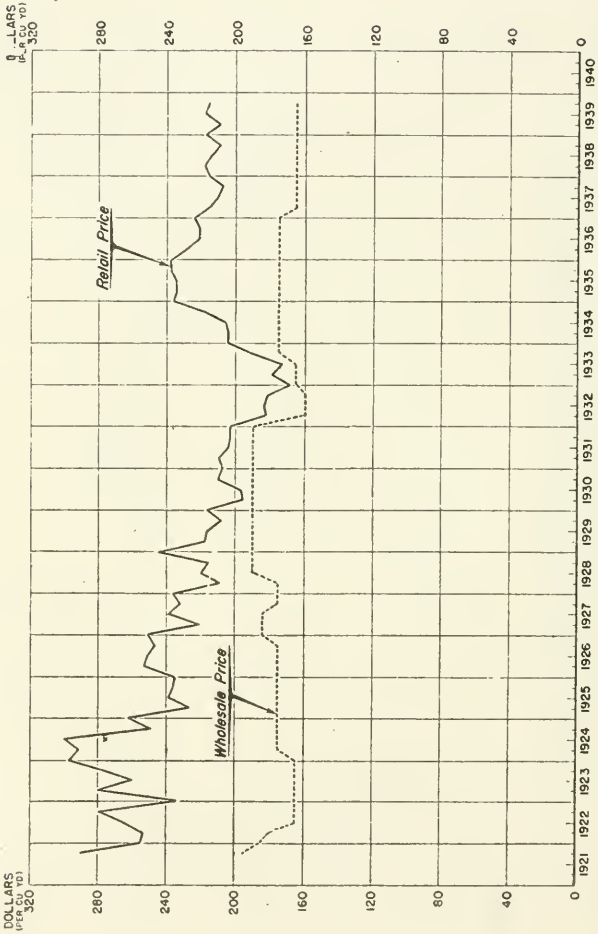
SOURCE: RETAIL PRICE, FABRICATED 6" I BEAM, L. C. L. DELIVERED. Bureau of Standards, Division of Building and Housing, "Building Material Prices", Sept. 1921 to June, 1933. "RUN 84" Sept. 1933 to March 1935. Compiled by Construction Analysis Unit of WPA, Based on Building Material Prices Reported by Engineering News-Record, June 1935 to Date.

WHOLESALE PRICE, STRUCTURAL STEEL SHAPES, BEAMS ETC., 3"-15" MILL, PITTSBURGH. Bureau of Labor Statistics, Wholesale Price Division.

CHART VIII

RETAIL AND WHOLESALE PRICES OF CRUSHED STONE

UNITED STATES, SEPTEMBER, 1921-SEPTEMBER, 1939



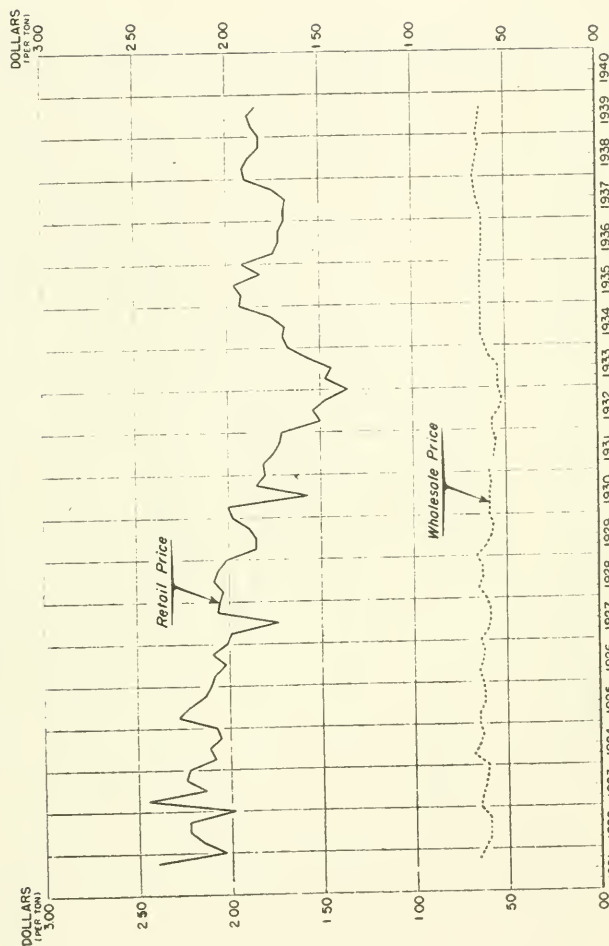
SOURCE: RETAIL PRICE, ^{1/2} T. C. L. DELIVERED, Bureau of Standards, Division of Building and Heating, "Building Material Prices", Sept., 1921 to June, 1933, Code Authority for Builders Supplies; Wholesale Price, ^{1/2} T. C. L. DELIVERED, Bureau of Standards, Division of Building and Heating, "Building Material Prices", Sept., 1921 to June, 1933, Code Authority for Builders Supplies. Reported by Engineering News-Record, June, 1935 to date.

WHOLESALE PRICE, 1 1/2 T. C. L. TO CONTRACTOR, ALONGSIDE DOCK, F. O. B. NEW YORK, Bureau of Labor Statistics, Wholesale Price Division

CHART IX

RETAIL AND WHOLESALE PRICES OF BUILDING SAND

UNITED STATES, SEPTEMBER, 1921 - SEPTEMBER, 1939



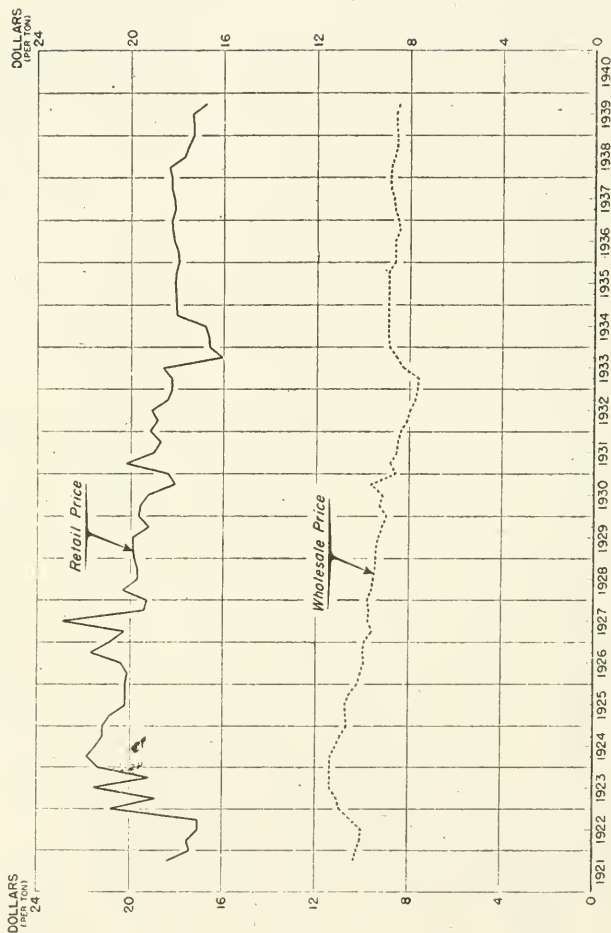
SOURCE: RETAIL PRICE, L.C.L. DELIVERED. Bureau of Statistics, Division of Building and Housing, Building Materials Prices, Sept. 1921 to June 1933. Code Issued by the Bureau, Supplies Trade Sept. 1933 to Dec. 1934. Reports to BHA from Builders' Supplies Reports, March 1935. Compiled by Construction Analysis Unit of BHA, based on building material price reports by Engineering News-Record, June 1935 to date.

WHOLESALE PRICE, AVERAGE OF 31 FIRMS, PER TON, AT PIT. Bureau of Labor Statistics, Wholesale Price Division.

CHART X

RETAIL AND WHOLESALE PRICES OF HYDRATED LIME

UNITED STATES, SEPTEMBER, 1921 - SEPTEMBER, 1939



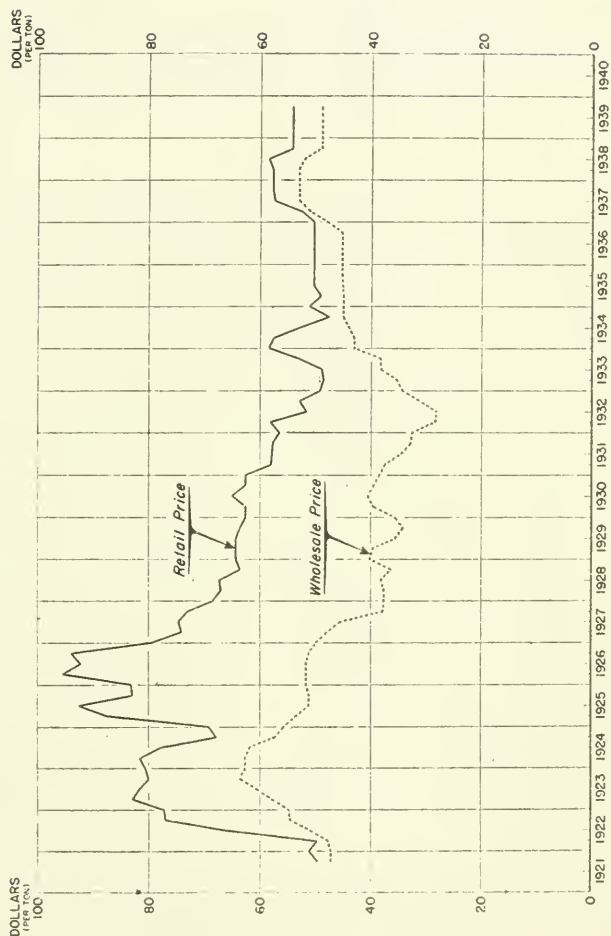
SOURCE: RETAIL PRICE, U. S. L. DELIVERED. Bureau of Standards, Division of Building and Housing, Building Material Prices, Sept. 1921 to June 1933. Code Authority for the Builders Supply Trade, Sept. 1933 to Dec. 1934. Reports to National Builders Supply Prices, March 1935. Compiled by Construction Analysis Unit of WPA, based on building material prices reported by the National Builders Supply Trade, June 1935 to date.

WHOLESALE PRICE, U. S. COMPOSITE PRICE PER TON AT K. L. B. Bureau of Labor Statistics, Wholesale Price Division.

CHART XI

RETAIL AND WHOLESALE PRICES OF CAST IRON SOIL PIPE

UNITED STATES, SEPTEMBER, 1921 - SEPTEMBER, 1939



RETAIL PRICE, 4" EXTRA HEAVY, U.C.L. DELIVERED. Bureau of Standards, Division of Building and Mining, Building Material Price, Sept. 1921 to June 1933; Reports to MBS from Builders Supply Retailers, Sept. 1933 to March 1935; Compiled by Construction Analysis Unit of A.P.A., based on building material prices reported by Engineering News-Record, June 1935 to date.

WHOLESALE PRICE, 8" 4"x5 B AND HEAVIER, 5' DELIVERED, M.W. CO. Bureau of Labor Statistics, Wholesale Price Division.

APPENDIX C

VOLUNTARY CODE OF FAIR COMPETITION GOVERNING THE EMPLOYMENT OF PLASTERERS BY GENERAL BUILDING CONTRACTORS IN THE BOROUGHES OF MANHATTAN AND THE BRONX IN THE CITY OF NEW YORK

I. PURPOSE

(a) Heretofore and on or about the 7th day of April 1937 a voluntary code of fair competition was adopted for subcontractors engaged exclusively in plastering work in the Boroughs of Manhattan and the Bronx in the city and State of New York. The purpose of that code is set forth in the voluntary code adopted by such plastering contractors. In addition, however, to subcontractors, general contractors also in many instances perform their own plastering and do not subcontract such work. With the adoption of this code all contractors employing plasterers will be afforded an opportunity to become participants in codes of fair competition for the plastering industry.

Thus the purpose of this code is to establish fair trade practice regulations for general contractors engaged in plastering in the Boroughs of Manhattan and the Bronx; to provide for a bid depository and registration of contracts for general contractors. It has been the experience of this industry that work taken below cost results in lower wage scales creating conditions inimicable to the best interests of employer and employee. It is the opinion of the parties that the adoption of this code will go far toward insuring the payment of the wage scale to all plasterers and that unless this code of fair competition is adopted Local No. 60, O. P. & C. F. I. A. will be obliged to adopt other methods to insure the payment of the wage scale. It is believed that improvement and correction can best be accomplished by establishing definite wage scales to be agreed upon between truly representative associations of employers and employees as a result of bona fide collective bargaining and the adoption of proper rules and standards for the guidance of the industry.

(b) For the purposes of this Code an Employer as used herein means any person, firm, or corporation who by formal contract or otherwise directs and/or superintends and/or coordinates and/or executes substantially in its entirety the work of constructing any fixed structure or physical improvement or modification thereof or addition or repair thereto, inclusive of partition walls or any other repairs or changes major or minor in any structure, provided that in such construction work is included labor and materials required to execute plain plastering, ornamental plastering or any work relating thereto usually performed by the craftsmen enumerated in Section I of Article III of the agreement. An Employer shall maintain a permanent place of business, with a business telephone, and open to the public during normal

business hours. This place of business shall not be connected with or be part of a domestic establishment. He shall carry Workmen's Compensation Insurance and such other insurance as may be required by City, State, or Federal Laws; and also maintain proper records normally required in the conduct of business.

(c) For the purpose of this Code, Local No. 60, O. P. & C. F. I. A. is hereinafter designated as the "Union."

(d) This agreement is recognized by the Employers and by the union as the Code.

II. TERM OF AGREEMENT

This voluntary Code shall become effective July 1st, 1937, and remain in full force and effect until May 31st, 1939, unless the agreement between the Union and the Building Contractors Employers Association, dated June 24th, 1937, is terminated prior thereto, in which event this Code shall end with the termination of said agreement. The Administrative Committee hereinafter designated, however, shall have the power to alter, amend, revise, or eliminate any portion of these regulations, consistent with the best interests of the industry, and shall give due notice of same in writing to all interested parties.

III. CONDITIONS OF EMPLOYMENT

All parties to this Code shall maintain the hours, wages, and working conditions as provided in the agreement between the Building Contractors Employers Association, Inc., and Local No. 60 of the O. P. & C. F. I. A., dated June 24th, 1937, and no employer is eligible to sign this Voluntary Code unless he has become a party to the agreement.

IV. ADMINISTRATION

(a) The Administration of this Code shall be under the direction of a Code Committee consisting of six members and of a Managing Director, if one is designated as hereinbefore set forth.

(b) The six members of the Code Committee shall not receive compensation from Committee funds other than for any direct expense incurred by them in the performance of their duties as committee members. They shall be appointed as follows:

Three (3) members of the Building Contractors Association; and
Three (3) members of the Union, one of whom shall be the President of Local No. 60, O. P. & C. F. I. A.

(c) No member shall be permitted to sit as a member of a Committee or Board on a case in which he is involved.

(d) Alternates shall be named by the Association and the Union. They shall sit and vote only when taking the place of an absent member or when a case before the Committee or Board involves a member of the Committee or Board.

(e) The Code Committee shall be divided into two branches: one branch to be known as the Administrative Committee and the other branch as the Industrial Board.

(f) The Administrative Committee shall be comprised as follows:

Three (3) members of the Building Contractors Employers Association, Inc.; and

One (1) member of the Union, who shall be the President of Local No. 60, O. P. & C. F. I. A.

V. ADMINISTRATIVE COMMITTEE

(a) The Administrative Committee may, by unanimous vote, appoint a Managing Director whose duties shall be to direct the activities of the Committee and investigate reports and complaints of violations.

(b) The Administrative Committee shall select one of its members to act as treasurer of the Committee, who shall keep all funds on deposit in the name of the Building Contractors Plastering Code Committee, in a bank selected by the Committee. He shall disburse the funds as directed by check which shall be countersigned as directed by the Administrative Committee.

(c) The Administrative Committee shall have the power to create such organization as may be necessary to properly carry on the administrative work under the Code.

(d) Except where a larger vote is expressly provided, the Administrative Committee shall act by majority only. Each member of the Committee shall cast one vote, except the representative of the Union, who shall cast three votes, and in case of a tie vote the Managing Director, if one is designated, shall cast the deciding vote. The decision of the Administrative Committee shall be binding on all parties to this agreement.

(e) The Administrative Committee shall hold a regular meeting once each week. It shall hold special meetings at the call of the Chairman or of any two members thereof. It shall formulate and prescribe its own rules of procedure.

(f) To defray the expenses of administering the Code, the Administrative Committee shall have the power to—

1. Assess each employer the sum of One Hundred (\$100) Dollars at the time of signing this code. One-half of this assessment or the sum of Fifty (\$50) Dollars shall be applied to registration fees on contracts registered by the employer within six (6) months from the date of signing this code. At the end of the six-months period, the full \$50.00, if no contracts have been registered; or the balance of \$50.00, if any, after having applied registration fees on contracts registered within the six months, shall accrue to the funds of the Code Committee.

2. Charge a fee not in excess of twenty-five (25¢) cents for each bid filed by the employer.

3. Charge a fee not in excess of one and one-half percent (1½%) of the price allocated for plastering work on each general contract or order filed as provided herein. The total fee shall be paid at the time of the registration of the contract or order.

(g) The Administrative Committee shall collect and disseminate all data currently affecting the industry, and to this end it is incumbent upon the employers and the Union to give their fullest cooperation.

(h) The Administrative Committee shall have the power to collect dues of the Building Contractors Employers Association, Inc., at the time an employer registers a contract provided that the Building Contractors Employers Association, Inc., confers this power on the Committee.

(i) Upon the written complaint of any of the parties to this agreement, the Administrative Committee shall, or on its own initiative

may, make such investigations as will enable it to determine whether or not there has been any violation in respect of this Code of Fair Competition or of any of the regulations promulgated by the Code Committee.

In making an investigation the Administrative Committee may direct an employer to appear before it by giving him forty-eight (48) hours' notice by registered mail addressed to his last known business address. Should the employer being investigated be found in violation of this Code or the regulations in connection with same, it shall have the power to impose any or all of the following penalties:

1. Censure of the employer.
2. Assess the employer not in excess of ten percent (10%) of the amount allocated for plastering on the contract involved, and in no event shall this amount exceed the sum of Nine Hundred (\$900) Dollars.

3. Require the employer to have the foreman and all of the plasterers on a specific job sent to him by the Union.

4. Suspend the employer from participation in this Code and the Agreement of which this Code is a part. The Code and agreement, however, shall continue in full force and effect as between the other parties thereto.

Should an employer fail to appear after having been given due notice, the Administrative Committee may proceed with the case and its decision shall be final and binding upon all parties to the agreement.

(j) The Administrative Committee shall refer to the Industrial Board any and all questions and disputes between employers and their Union employees.

VI. INDUSTRIAL BOARD

(a) The Industrial Board shall be composed as follows:

Three (3) members of the Building Contractors Employers Association, Inc., and

Three (3) members of the Union.

(b) The Industrial Board shall act by a majority only, except as otherwise provided in the agreement. Each member shall be entitled to one vote, and in case of a tie vote the Managing Director, if one has been designated, shall cast the deciding vote.

(c) The Industrial Board shall consider and act upon all matters that may come before them.

(d) The Industrial Board shall formulate and prescribe its own rules of procedure.

GENERAL RULES

The following rules of conduct are applicable in all cases where an employer does not subcontract the plastering work on a general contract and are applicable to all general contracts in which the employer intends to perform the plastering work directly. These rules are not applicable to any contract which includes only plastering. These rules must be observed by each employer signing this voluntary code:

(a) Upon being invited to submit an estimate on a job in which plastering constitutes an item of work, each employer shall notify the Administrative Committee, or the Managing Director, if one is designated, of his intention to submit a bid. Cards will be provided for this purpose.

(b) The Administrative Committee shall establish a depository for the filing of data with respect to such bid hereinafter set forth. Each employer shall, within 24 hours after the submission of a bid on a job on which the amount allocated for plastering is \$300 or more, file a true statement of the aggregate amount of such bid, as well as a statement of the portion of such bid allocated for plastering work. There shall also be filed any revisions of such statement, whether caused by changes in plans or specifications, or merely by change in price, with the designated depository. Special envelopes shall be used for this purpose. The bids will be opened by the Managing Director, if one is designated, or such person or persons as shall be appointed by the Administrative Committee, and held in confidence until such time as the contract of which the plastering work is a part is awarded, and then a tabulation of the figures may, in the discretion of the Administrative Committee, be sent to each bidder who has filed such statements with the bid depository as hereinabove outlined.

(c) There shall be filed with each copy of such proposal a break-down of that part of the work allocated to plastering into the following items:

1. Price of work all located for plastering;
2. Total amount included for models; for furnishing and erection of plaster ornaments; including job expense;
3. Total amount included for furnishing and erection of furring, lathing, and beads, including job expense;
4. Total amount included for all other work, including job expense;
5. Total amount included for overhead and profit.

(d) The break-down of the price of the work allocated to plastering shall carry a notation excluding temporary light, heat, and enclosures; water; cleaning, gathering and removal of rubbish; removal of old work, patching of completed plastered surfaces after other trades; any scaffold where the height of same is more than fourteen feet.

(e) If the plastering work contemplated by the bid does not include furring, or lathing, a notation shall be made in the same excluding the furnishing or erection of scaffolding or scaffold materials to the lather.

(f) Each bid shall carry a notation that a copy of same has been filed with the Building Contractors' Plastering Code Committee.

(g) Job expense shall include all items the amounts of which are dependent upon other items of job costs, such as trucking, hoisting, sales tax, tools, mixing machines, equipment or the loss of, or wear and tear of same.

(h) A building contractor shall not submit a bid or accept a contract which does not include all direct and indirect costs, and shall maintain and keep on file his original estimate supporting his bid, and/or contract. A building contractor who accepts a contract which does not include all direct and indirect costs shall be conclusively presumed to be paying the plasterers to be employed on such contract less than the scale of wages established and prevailing for plasterers that are members of the Union. The labor costs on any contract shall be computed upon the basis of prevailing scales of wages established by unions affiliated with the American Federation of Labor. Every bid submitted by a building contractor and every contract accepted by a building contractor shall include therein the true cost of material, labor, job expense, and general overhead on each contract. In the

price allocated for plastering on each general contract, each building contractor shall figure the true cost of material, labor, and job expense to which he shall add an item of overhead expense which shall be not less than twenty-two percent (22%) of the labor costs of the plastering (the labor cost is the total amount of wages to be paid to employees as enumerated in Article III of the agreement, plus wages to be paid to plasterers' helpers, plus Workmen's Compensation Insurance, Public Liability Insurance, Unemployment Insurance, and Old Age Security Insurance). In order that the Administrative Committee may determine that the wages as set forth in the agreement are being paid, or that it is conclusively deemed will be paid, it may set up schedules setting forth maximum productions of labor and maximum coverage of materials based on the actual experience of the industry and based on good workmanship and the use of proper materials. With respect to plastering work, the schedules to be adopted shall be those provided for under the Voluntary Code of Fair Competition for the Plastering Contracting Industry in the Boroughs of Manhattan and the Bronx, pursuant to agreement between the Contracting Plastering Association of Greater New York, the Greater New York Employing Plasterers Association, Inc., and Local No. 60 of the Operative Plasterers and Cement Finishers International Association, dated April 7th, 1937.

(i) Overtime work in which plasterers are employed shall only be performed by permission of the Administrative Committee.

(j) Revisions in estimates due to changes in regular wage rates or material prices, or changes in the original plans or specifications, shall be made only to an extent consistent with previous quotations.

(k) Should an employer wish to reduce an estimate that he has already submitted, for reasons other than noted in paragraph (j), such reduction shall not be more than five (5%) percent, and the reduced price should still comply with the requirements of paragraph (h).

(l) Within twenty-four (24) hours of the actual closing of a contract or order upon which the plastering work to be performed as allocated, is estimated to amount to Fifty Dollars (\$50.00) or more, a statement describing such order or contract, together with a statement of the amount allocated for plastering work on such contract or order shall be filed with the Administrative Committee, or the Managing Director, if one is designated, or such other person or persons as may be appointed by the Administrative Committee, on forms to be supplied for this purpose, and a fee not in excess of one and one-half percent (1½%) of the price allocated for plastering work is to be paid. The total fee shall be paid at the time of the registration of the contract or order. At the time of such payment, a registration certificate of the same is to be posted in a conspicuous place on the job.

(m) On or before Tuesday of each week, a statement or pay-roll record of the amount paid to plasterers for each job for the preceding pay-roll week shall be filed with the Managing Director, if one is designated, or such other person as may be appointed for such purpose by the Administrative Committee.

(n) An employer or his agent shall accept no rebates, directly or indirectly, on such wages as are prescribed in the agreement of which this Code is a part or give anything of value, or extend favors to any person for the purpose of influencing rates or wages or the working conditions of his employees.

(o) No employer shall make any secret agreement with any awarding authority, or with a purchaser concerning any terms of payment, rebate, or special conditions not included in his original bid.

(p) Should any employer charge another with a violation of any of the principles of these rules of conduct, such charges shall be filed in writing with the Administrative Committee, or with the Managing Director, if one is designated, or with such other person or persons as shall be appointed by the Administrative Committee.

(q) The Managing Director, if one is designated, or such other person as shall be appointed for such purpose by the Administrative Committee, shall have full power to investigate all complaints, and shall be given every opportunity when requested, to check the records of employers for the purpose of obtaining assurance that these Rules of Conduct are being complied with.

Employers against whom complaints are filed shall, upon demand of the Managing Director, if one is designated, or such other person as appointed by the Administrative Committee, furnish a break-down of the bid made, and the true cost of performance of the contract, inclusive of the bid and cost of all material, labor, job, and overhead expense constituting part of the contract to be performed.

(r) In cases where the charges involve unfair bidding, the Managing Director, if one is designated, or such person as may be designated by the Administrative Committee shall have the right to check the estimates of any of the bidders on the work; require the submission of all data in possession of any of the bidders; and to call on any employer, whether or not he is interested in the particular case for any information deemed helpful in reaching a fair and just decision.

CONCLUSION

Every employer who is a party to this agreement agrees jointly and severally (with a right to contribution as among themselves) to hold the Managing Director, if one is designated, and the representatives on the Industrial Board or the Administrative Committee of the Code Committee or on any other Committee or Subcommittee under this agreement selected by the BUILDING CONTRACTORS EMPLOYERS ASSOCIATION, INC., free and harmless from any liability imposed upon them and arising out of the proper performance of their duties under this agreement.

The Union and its members agree jointly and severally (with a right to contribution as among themselves) to hold the Managing Director, if one is designated, and the representatives on the Industrial Board of the Administrative Committee of the Code Committee or on any other Committee or Subcommittee under this agreement selected by the Union free and harmless from any liability imposed upon them and arising out of the proper performance of their duties under this agreement.

Neither any party to this agreement, nor the Managing Director, if one is designated, nor any representative on the Industrial Board of the Administrative Committee of the Code Committee or on any other Committee or Subcommittee under this agreement exercising reasonable diligence in the conduct of his duties hereunder, shall be liable to any party hereto or to anyone else for any action or failure to act under this agreement except for his willful misfeasance or nonfeasance.

Should any part of this agreement be held to be illegal by the State or Federal authorities, such portion shall immediately be eliminated, but this shall not void the agreement as to such eliminated portions.

Each employer or party signing this Voluntary Code shall and does agree to abide by and carry out the rules and regulations as set forth, and further agrees that if found guilty of any violation by the Administrative Committee or Industrial Board, that he will comply with and carry out, or pay such penalty as may be assessed against him, and that he waives any right to appeal from such findings of the Committee or Board.

This Voluntary Code forms an agreement and contract between each of the parties signatory hereto to carry out the provisions as set forth.

Signed this 24th day of June, Nineteen Hundred and Thirty-seven.

BUILDING CONTRACTORS EMPLOYERS ASSOCIATION, INC.,
By JAMES S. O'CONNELL, *President*.

OPERATIVE PLASTERERS' AND CEMENT FINISHERS'
INTERNATIONAL ASSOCIATION, LOCAL No. 60,
By JOHN E. GALLAGHER, *President*.

FORM OF RATIFICATION

We, the undersigned, hereby expressly ratify and approve the execution of this Code on our behalf and agree to be bound hereby as parties hereto.

APPENDIX D

CASES INVOLVED IN BUILDING INVESTIGATION OF THE ANTITRUST DIVISION OF THE DEPARTMENT OF JUSTICE AS OF JUNE 13, 1940

ATLANTA, GA.

Indictments.—*United States v. Hiram Evans, et al* (asphalt).

CHICAGO, ILL.

Indictments.—*United States v. Mosaic Tile Co., et al.*; *United States v. United Brotherhood of Carpenters & Joiners* (plywood); *United States v. Chicago & Cook County Building & Construction Trades Council, et al.* (cut stone); *United States v. Beardslee Chandelier Mfg. Co., et al.* (electrical); *United States v. Glass Contractors Ass'n., et al.*

CLEVELAND, OHIO

Indictments.—*United States v. Glaze-Rite Co., et al* (glazing); *United States v. Central Supply Ass'n. et al.* (plumbing).

DETROIT, MICH.

Indictments.—*United States v. Wheeling Tile Company, et al.*; *United States v. Cadillac Electric Supply Co., et al.*; *United States v. Brooker Engineering Co., et al* (electrical contractors).

LOS ANGELES, CALIF.

Indictments.—*United States v. Heating, Piping & Air Conditioning Contractors Association of Southern California, et al.*; *United States v. Southern California Marble Dealers Ass'n.*; *United States v. Contracting Plasterers' Association of Long Beach, Inc., et al.*; *United States v. Harbor District Chapter, Nat'l Electrical Contractors Association, et al.*; *United States v. Santa Barbara County Division Electrical Contractors Exchange, Inc.*; *United States v. Harbor District Lumber Dealers' Association.*

NEW ORLEANS, LA.

Indictments.—*United States v. New Orleans Chapter, Associated General Contractors of America, Inc., et al.*; *United States v. New Orleans Sheet Metal Association, Inc.*; *United States v. Engineering Survey & Audit Co., et al* (electrical); *United States v. Building & Construction Trades Council of New Orleans, et al.*; *United States v. Southern Pine Association, et al.*

Equity.—*United States v. New Orleans Chapter, Associated General Contractors of America*; *United States v. New Orleans Sheet Metal Association, Inc.*, *United States v. Engineering Survey & Audit Co., et al.* (electrical); *United States v. Southern Pine Association, et al.*

NEW YORK CITY

Indictments.—*United States v. Long Island Sand & Gravel Producers' Association et al.*; *United States v. The Sines Co., Inc., et al.* (one of 8 similar indictments) (electrical); *United States v. International Longshoremen's Association* (trucking); *United States v. Local Union No. 3, International Brotherhood of Electrical Workers, et al.* (three cases); *United States v. N. Y. Electrical Contracting Association Local Union No. 3, etc.* *United States v. Local 138 International Brotherhood of Teamsters* (Nat Hoffman); *United States v. Local 46, Wood, Wire & Metal Lathers International Union* (three cases).

Equity.—*United States v. Masonite Corporation, et al.*; *United States v. Long Island Sand & Gravel Producers' Association, et al.*

PITTSBURGH, PA.

Indictments.—*United States v. Franklin Electric & Construction Co.* (one of 35 similar indictments); *United States v. William F. Hess et al.* (electrical contractors); *United States v. Lumber Institute of Allegheny County et al.*

Equity.—*United States v. Voluntary Code of the Heating, Piping and Air Conditioning Industry for Allegheny County et al.*; *United States v. Pittsburgh Tile & Mantel Contractors Ass'n*; *United States v. Marble Contractors Ass'n et al.*; *United States v. Western Penn. Sand & Gravel Ass'n*; *United States v. Employing Plasterers' Ass'n et al.*

ST. LOUIS, MO.

Indictments.—*United States v. William L. Hutcheson et al.* (carpenters' union); *United States v. Arthur Morgan Trucking Co.*; *United States v. St. Louis Tile Contractors' Ass'n et al.*

SAN FRANCISCO, CALIF.

Indictments.—*United States v. E. L. Bruce Company, Inc. et al.* (hardwood floor dealer); *United States v. San Francisco Electrical Contractors Ass'n Inc., et al.*; *United States v. San Francisco Hardwood Floor Contractors' Ass'n, et al.*; *United States v. Master Plasterers' Ass'n of San Francisco et al.*; *United States v. W. P. Fuller & Co.* (glass).

SEATTLE, WASH.

Indictments.—*United States v. Associated Plumbing & Heating Merchants et al.*; *United States v. Local 99, Sheet Metal Workers Int. Ass'n et al.*; *United States v. Kelley-Goodwin Hardwood Co., Inc., et al.*

WASHINGTON, D. C.

Indictments.—*United States v. Drivers, Chauffeurs & Helpers Local No. 639, Int. Br. Teamsters, Chauffeurs, Stablemen & Helpers of America et al.*

Equity.—*United States v. Excavators Administrative Ass'n, Inc., et al.*; *United States v. Plumbing & Heating Industries Administrative Ass'n, Inc., et al.*; *United States v. Union Painters Administrative Ass'n, Inc., et al.*; *United States v. Mason Contractors' Ass'n.*

APPENDIX E

EXHIBIT No. 1

Net effect upon housing costs of identical reductions in each component

Components	Percent reduction in annual housing costs resulting from reduction in respective component of—				
	5 percent	10 percent	25 percent	50 percent	100 percent
Cost of house.....	4.2	8.5	21.2	42.5	85.0
Cost of land.....	.8	1.5	3.8	7.5	15.0
Cost of property.....	5.0	10.0	25.0	50.0	100.0
Interest.....	1.9	3.8	9.1	17.6	31.6
Taxes.....	1.2	2.4	6.0	11.9	23.8
Depreciation.....	.4	.8	1.9	3.8	7.6
Maintenance.....	1.0	1.9	4.8	9.5	19.0
Insurance.....	.1	.2	.5	1.0	1.9

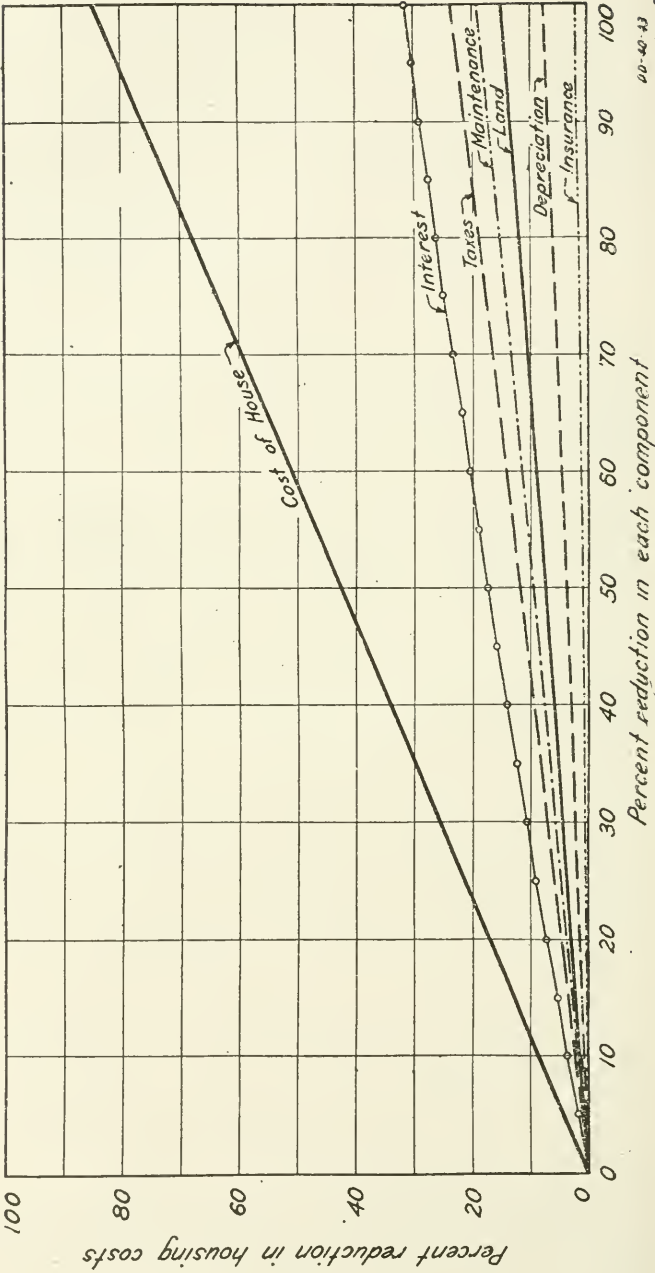
The percentages shown for each component represent the net reduction in the total annual charge for housing (owner-occupancy) which would result from a reduction in the respective component of the size indicated at the top of each column, all other components remaining unchanged. For example, a 50 percent reduction in the interest rate (from 5 percent to 2½ percent), with no reduction in any other item, would result in a 17.6 percent reduction in the total annual charge for housing.

The assumptions upon which this table is calculated are: House represents 85 percent of the total property cost; land represents 15 percent. This corresponds to the average for all properties insured by the Federal Housing Administration under title II during 1938. Life of house is assumed to be 40 years. Present economic rent distribution is assumed to be as follows: Interest, 5 percent; taxes, 2.5 percent, which closely approximates the average effective rate for 274 cities in 1938; depreciation, 0.83 percent, which will write off the investment in 40 years at 5 percent interest (sinking-fund basis); maintenance, 2 percent a year; and fire insurance, 0.2 percent; or a total economic rent of 10.53 percent of the total property value (original cost) annually. This rate applies only to owner-occupied properties. Tenant families must pay in addition a small charge for management of the property.

It is assumed further that reductions in the interest rate upon the loan would be accompanied by corresponding reductions in the interest rate upon the depreciation fund.

In calculating the reductions in the annual charge which would result from reduced building costs, it is assumed that the interest rate, tax rate, depreciation rate, maintenance rate, and insurance rate would remain unchanged as the cost of the house is lowered, and that the total percentage charge for housing per year would remain at 10.53 percent

CHART XII
NET EFFECT UPON HOUSING COSTS
OF IDENTICAL REDUCTIONS
IN EACH COMPONENT



of the original property value (land and house). Of course, it might be true that if housing costs (capital costs) should generally decline, the tax rate or assessment ratio might be increased. That is a debatable point, however, and there seems to be equal justification for assuming that the rate on residential properties would remain unchanged or would be increased only slightly, and that a part of the tax burden would be shifted to income taxes or some other form of taxation, or away from residential properties to commercial and industrial properties; or that costs of local government would be decreased by the elimination of slum conditions through low-cost housing.

EXHIBIT No. 2

Property valuation of new single-family homes insured by F. H. A. during 1938

Property valuation ¹	Percent of homes		Property valuation ¹	Percent of homes	
	Simple	Cumulative		Simple	Cumulative
Less than \$2,000.....	0.1	0.1	\$7,000 to \$7,999.....	7.5	90.7
\$2,000 to \$2,999.....	3.7	3.8	\$8,000 to \$9,999.....	5.7	96.4
\$3,000 to \$3,999.....	15.2	19.0	\$10,000 and over.....	3.6	-----
\$4,000 to \$4,999.....	23.5	42.5	Total.....	100.0	100.0
\$5,000 to \$5,999.....	22.8	65.3			
\$6,000 to \$6,999.....	17.9	83.2			

Average valuation:

1938.....	\$5,530
1937.....	5,978
1936.....	6,255
1935.....	6,450

¹ F. H. A. valuation includes value of house, all other physical improvements, and land. Average valuation for land was 14.2 percent of the total property valuation in 1938, 15.3 percent in 1937, 16.4 percent in 1936, and 17.5 percent in 1935.

Source: Fifth Annual Report of the Federal Housing Administration for the Year Ending Dec. 31, 1938, p. 101. Land valuation, p. 110.

EXHIBIT No. 3

Annual income of F. H. A. mortgage borrowers during 1938—New single-family homes

Borrower's annual income ¹	Percent of 1938 homes		Borrower's annual income ¹	Percent of 1938 homes	
	Simple	Cumulative		Simple	Cumulative
Less than \$1,000.....	0.2	0.2	\$3,500 to \$3,999.....	8.1	84.9
\$1,000 to \$1,499.....	3.3	3.5	\$4,000 to \$4,999.....	7.3	92.2
\$1,500 to \$1,999.....	17.3	20.8	\$5,000 and over.....	7.8	-----
\$2,000 to \$2,499.....	25.8	46.6	Total.....	100.0	100.0
\$2,500 to \$2,999.....	16.2	62.8			
\$3,000 to \$3,499.....	14.0	76.8			

Average income:

1938.....	\$2,968
1937.....	3,133
1936.....	3,387

¹ Includes family income of owner-occupants and individual purchasers only; excludes operative builders, absentee landlords, and others.

Source: Fifth Annual Report of the Federal Housing Administration for the Year Ending Dec. 31, 1938, p. 91.

EXHIBIT No. 4

Family incomes in the United States, 1935-36

Annual income	Percent of families		Annual income	Percent of families	
	Simple	Cumulative		Simple	Cumulative
Less than \$500.....	14.2	14.2	\$2,500 to \$2,999.....	4.5	91.9
\$500 to \$999.....	27.5	41.7	\$3,000 and over.....	8.1	-----
\$1,000 to \$1,499.....	22.9	64.6	Total.....	100.0	100.0
\$1,500 to \$1,999.....	14.4	79.0			
\$2,000 to \$2,499.....	8.4	87.4			

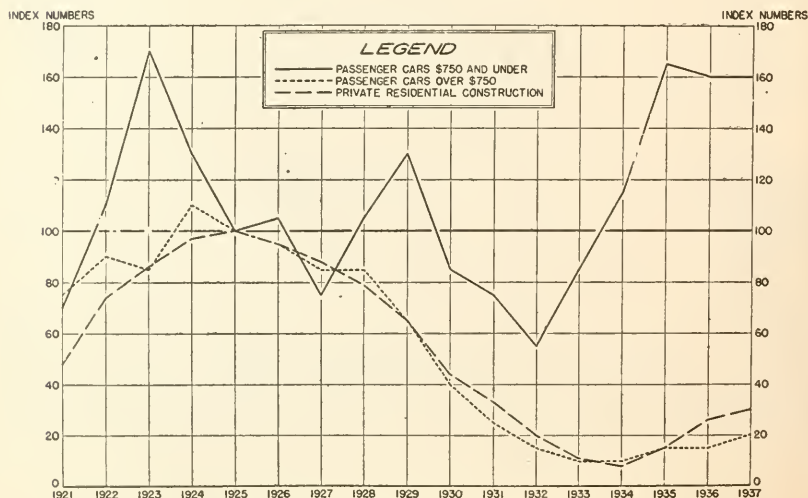
Source: Consumer Incomes in the United States, National Resources Committee, August 1938, p. 18.

EXHIBIT No. 5

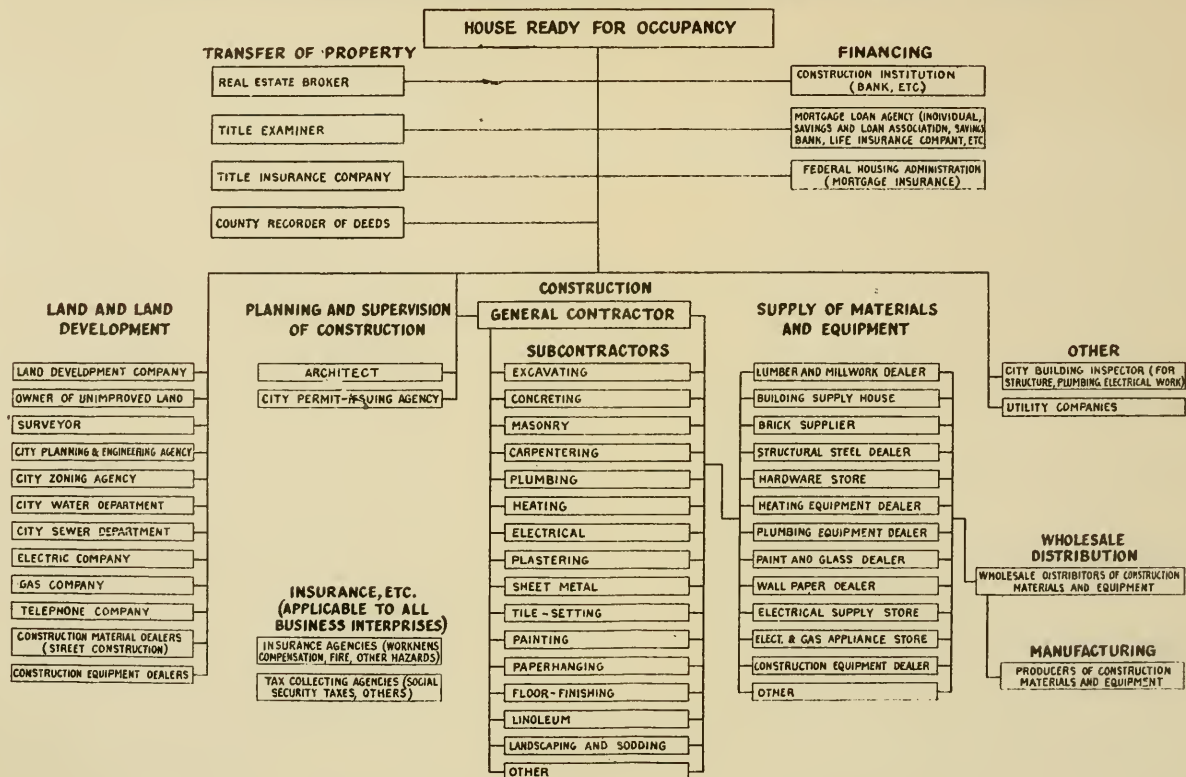
A significant point in connection with the reference to the market for higher-priced automobiles as compared to the market for low-priced cars is shown on the following chart. Beginning in 1924, the proportion of national income which was spent for higher-priced automobiles fell sharply to a low in 1934, and had risen only slightly by 1938; while the proportion spent for low-priced cars rose sharply beyond the higher-priced cars in 1928 and 1929, and after a decline from 1929 to 1932, rose rapidly to exceed even its 1929 peak by 1935. It is significant to note that the proportion of national income spent for houses has followed almost exactly the curve for higher-priced automobiles. If automobile manufacturers concentrated upon the manufacture of higher-priced cars, not only would there be only a fraction of the present number of cars in use today, but the automobile industry would have suffered far more seriously in the depression than it has.

CHART XIII

PROPORTION OF NATIONAL INCOME SPENT FOR HOMES
AND AUTOMOBILES
UNITED STATES, 1921-1937



MAJOR PARTICIPANTS IN THE CONSTRUCTION OF A SINGLE-FAMILY HOUSE IN AN URBAN AREA



Less
\$500
\$1,00
\$1,50
\$2,00

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EXHIBIT No. 6

Percent of the national income produced by the contract-construction industry

Year:	Percent	Year—Continued.	Percent
1929.....	4.5	1934.....	1.6
1930.....	4.3	1935.....	1.6
1931.....	3.4	1936.....	2.5
1932.....	2.1	1937.....	2.6
1933.....	1.3	1938.....	2.7

Source: Computed from Survey of Current Business, Bureau of Foreign and Domestic Commerce, June 1939, p. 11.

Percent of their 1929 income produced by major industry groups

Industry group	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Total national income.....	100.0	83.6	65.6	48.5	51.4	61.2	67.5	78.9	86.9	77.4
Agriculture.....	100.0	77.5	51.4	35.1	47.1	62.7	72.7	82.3	87.9	74.8
Mining.....	100.0	69.1	38.4	26.7	29.8	51.4	53.3	68.7	79.8	58.7
Electric light and power and manu- factured gas.....	100.0	94.2	89.8	79.7	74.2	81.5	82.2	88.0	94.7	90.1
Manufacturing.....	100.0	73.8	50.2	29.6	40.2	51.8	61.1	73.6	86.6	63.1
Contract-construction.....	100.0	78.6	49.0	22.0	14.5	21.6	24.5	43.4	49.5	46.8
Transportation.....	100.0	86.5	69.6	51.1	50.8	53.8	58.3	67.6	72.5	62.1
Communication.....	100.0	96.7	86.9	69.1	61.1	64.7	69.1	73.4	78.1	76.9
Trade.....	100.0	83.3	67.2	47.7	53.3	62.2	67.1	74.9	81.3	77.6
Finance.....	100.0	88.6	72.4	58.1	51.5	55.6	60.3	68.3	74.3	69.1
Service.....	100.0	90.8	76.4	57.8	55.1	63.8	70.2	78.6	88.1	84.1

Source: Survey of Current Business, Bureau of Foreign and Domestic Commerce, June 1939, p. 11.

EXHIBIT No. 7

The chart XIV illustrates roughly the large number and variety of separate and for the most part independent enterprises which participate in the construction of a typical single-family house in an urban area. There is no fixed pattern of organization. In probably most cases, the pattern would differ in some particular from that indicated by the chart. In many cases, there would be a fewer participants than are indicated; in many there would be more. The chart, however, illustrates effectively the complexity of organization in the building industry, and the difficulty of the problem of coordination.

EXHIBIT No. 8

Number of employers and employees in the contract-construction industry, 1938

Classification	Number of employers ¹	Number of employees ²
General contractors, building	22,003	248,063
General contractors, other	8,040	219,770
Special-trade contractors	66,690	350,185
Contractors, not classifiable	40	8,209
Total	96,773	826,227

¹ The number of employers is the number of business enterprises having employees, and in operation during the first 3 months of 1938. The number of employers includes about 4,000 who had no employees at the end of March, but excludes perhaps 50,000 or more enterprises which have no employees at any time.

² The number of employees is the number on the pay roll at the end of March including both office and field workers.

Source: Social Security Board (preliminary data).

Distribution of employers and employees in the contract-construction industry by size of business concern, 1938

Size of concern	Percent of total number of—		Size of concern	Percent of total number of—	
	Employers ¹	Employees ²		Employers ¹	Employees ²
1 employee	21.77	2.44	70 to 79 employees	0.26	2.17
2 employees	18.11	4.05	80 to 89 employees .....	.18	1.71
3 employees	13.48	4.54	90 to 99 employees .....	.16	1.65
4 employees	9.39	4.21	100 to 199 employees .....	.65	9.85
5 employees	6.85	3.83	200 to 299 employees .....	.17	4.77
6 employees	4.91	3.30	300 to 399 employees .....	.08	3.16
7 employees	3.90	3.06	400 to 499 employees .....	.03	1.65
8 employees	2.57	2.30	500 to 599 employees .....	.03	1.86
9 employees	2.08	2.09	600 to 699 employees .....	.02	1.27
10 to 19 employees	9.31	13.95	700 to 799 employees .....	.01	.83
20 to 29 employees	2.98	7.94	800 to 899 employees .....	.01	.67
30 to 39 employees	1.39	5.25	900 to 999 employees .....	.00	.35
40 to 49 employees .....	.78	3.87	1,000 employees or more .....	.02	3.59
50 to 59 employees .....	.51	3.11			
60 to 69 employees .....	.35	2.53	Total	100.0	100.0

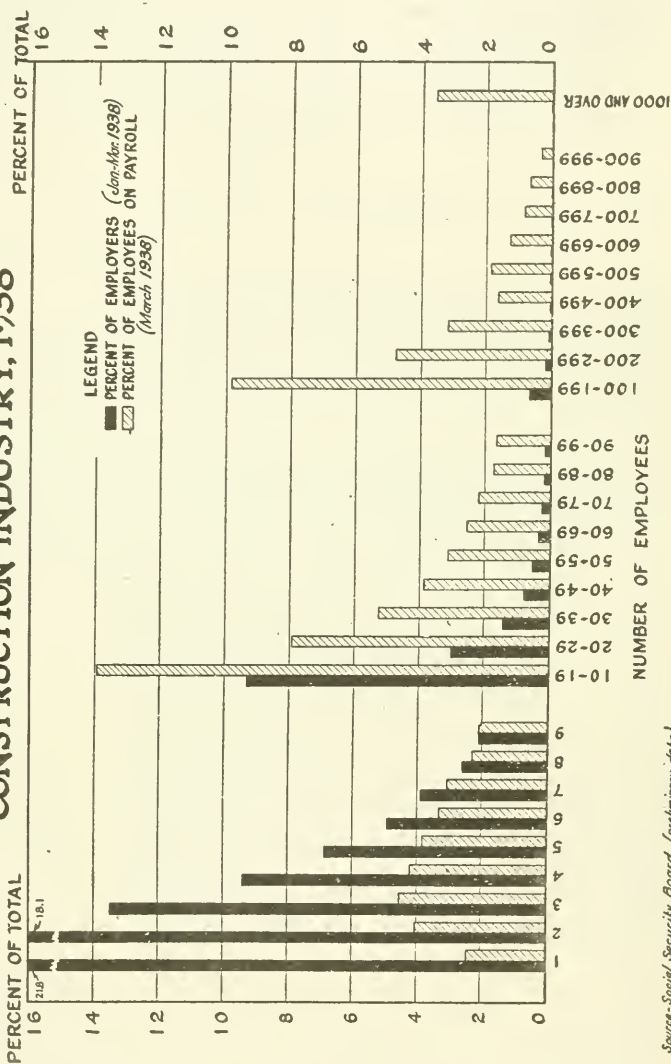
¹ The number of employers excludes 4,278 enterprises which had no employees at the end of March 1938 and which are included in the previous table. The total number of employers represented in this table therefore is 92,495.

² The number of employees is the number on the pay roll at the end of March 1938 (either last pay roll period or last day), including both office and field workers.

Source: Preliminary data secured from Social Security Board for use in public hearings before the Temporary National Economic Committee, June 1939.

CHART XV

DISTRIBUTION OF EMPLOYERS AND EMPLOYEES BY SIZE OF BUSINESS CONCERN, CONTRACT CONSTRUCTION INDUSTRY, 1938



Source: Social Security Board (preliminary data)

D.D. 95-170

EXHIBIT No. 9

Value of work performed by contract-construction establishments, 1935

Value of work:	Percent of all reporting establishments
Less than \$10,000-----	69. 5
\$10,000 to \$24,999-----	15. 4
\$25,000 to \$49,999-----	7. 2
\$50,000 to \$99,999-----	4. 2
\$100,000 to \$199,999-----	2. 1
\$200,000 to \$499,999-----	1. 2
\$500,000 to \$999,999-----	. 3
\$1,000,000 or more-----	. 1
Total-----	100. 0

Source: Census of Construction, 1935, Bureau of the Census, vol. III, p. 30.

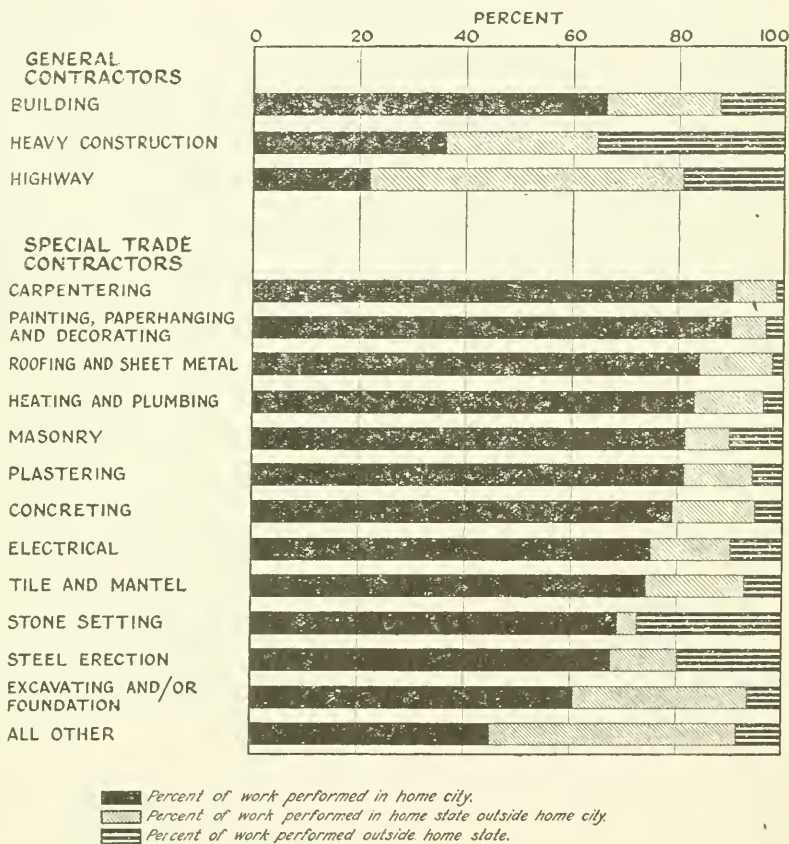
EXHIBIT No. 10

The following chart illustrates the local nature of the construction industry. In 1935, contracting establishments of all types reported that 57.5 percent of their work was done in the city in which the establishment was located (or in the immediate environs of that city); 27.4 percent was in the home State, outside the home city or its environs; and 15.1 percent was done outside the home State. It will be noted that many special-trade contractors, who work primarily upon residential construction, did practically all of their work in the home city or its environs.

CHART XVI

5

DISTRIBUTION OF WORK PERFORMED, BY LOCATION, CONTRACT CON- STRUCTION INDUSTRY, 1935



Source:—Bureau of the Census

DD-39-160

EXHIBIT No. 11

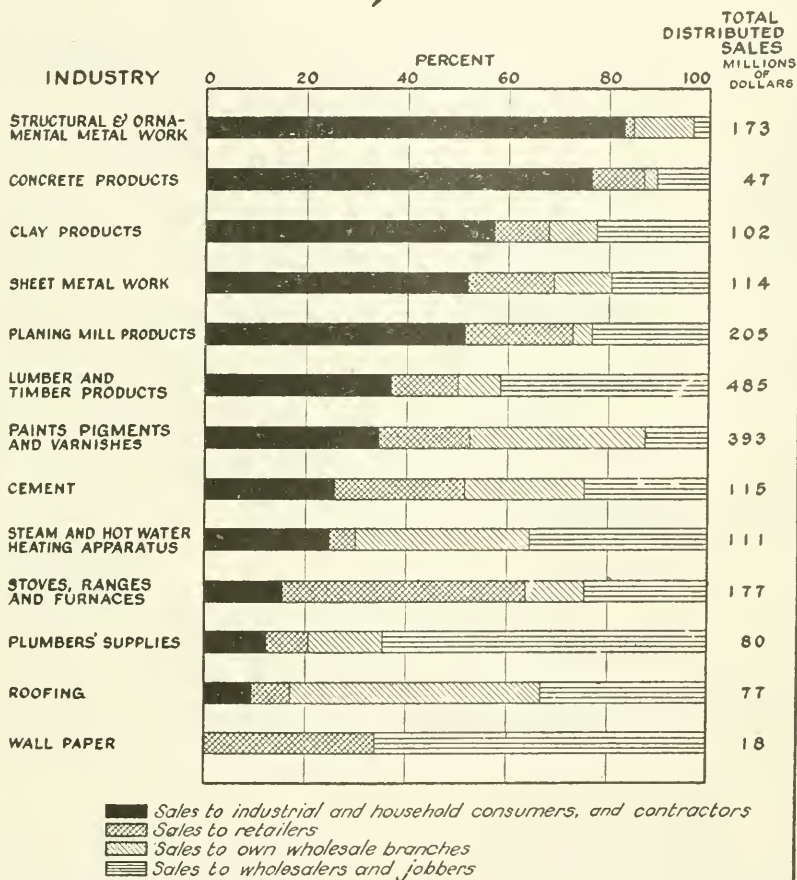
The following three charts show clearly the nature of the channels through which building materials and supplies pass from manufacturer to consumer. It will be observed that such things as hardware, wallpaper, plumbing and heating equipment, lumber, paints, and so forth, are distributed generally through retailers—the local lumber yard or hardware store. A comparatively small proportion of total sales of manufacturers or wholesalers are made directly to industrial and household consumers. Manufacturers of wallpaper, for example, show no direct sales at all to industrial and household consumers or contractors, and only a very small proportion of roofing and plumbing sales to such groups.

In studying these charts it is important to keep in mind that all of the items shown are materials which must go through further manufacture before they are useable in the form of a completed house. In no other comparable industry do we distribute the material necessary for production through retail channels.

Systematic organization of the building industry would by no means eliminate the local retail dealer. In "Exhibit No. 27," it is shown that in 1935 there were more people engaged in the retail distribution of new automobiles than in the retail distribution of all building materials and supplies. With systematic organization and improved techniques in the building industry, the local dealer would be engaged in distributing a more nearly completed or an entirely completed product in the form of a house ready for occupancy. Materials and supplies would be distributed in the most direct manner possible.

CHART XVII

SALES DISTRIBUTION OF MANUFACTURERS IN SELECTED INDUSTRIES 1935



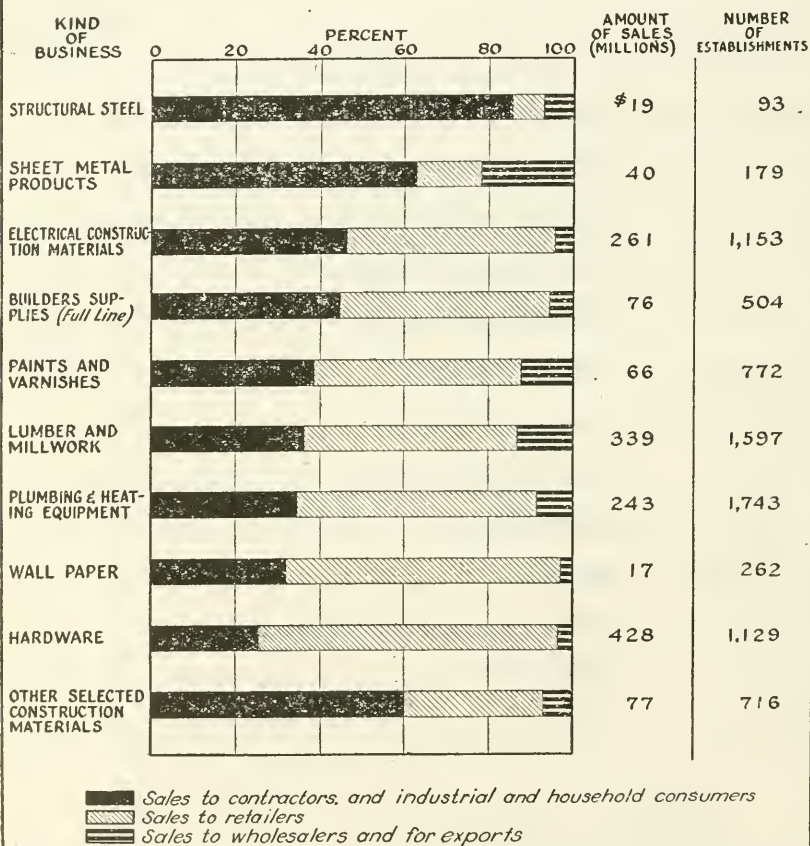
Source: Bureau of the Census

D.D.39-164

CHART XVIII

7

SALES DISTRIBUTION OF WHOLE-SALERS IN SELECTED KINDS OF BUSINESS 1935

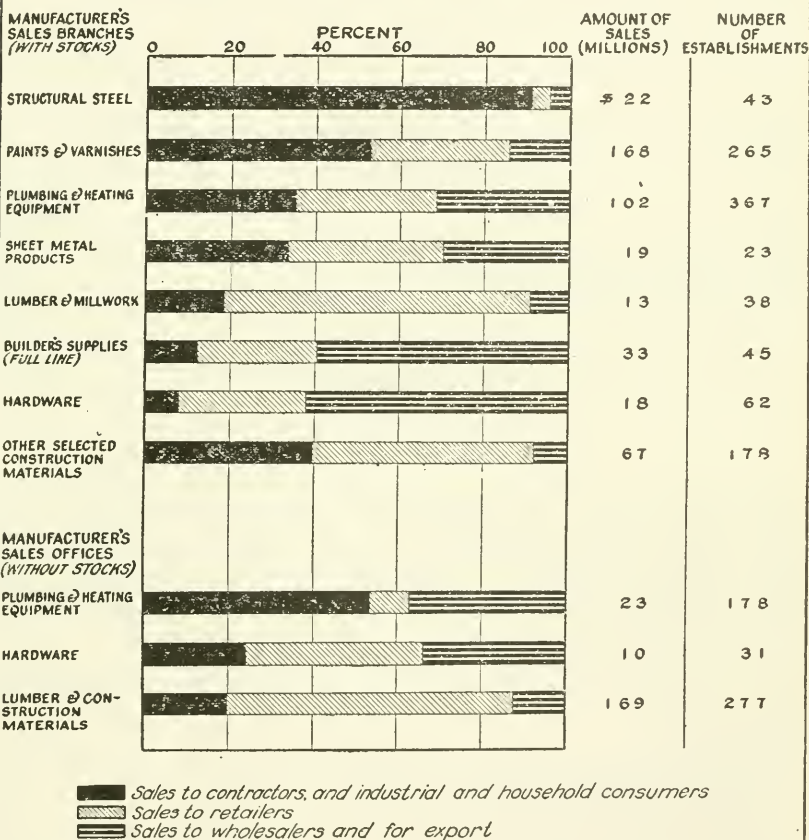


Source: Bureau of the Census

D O 39-163

CHART XIX

SALES DISTRIBUTION OF MANUFACTURER'S WHOLESALE BRANCHES IN SELECTED KINDS OF BUSINESS 1935



Source—Bureau of the Census

D.D. 39-165

EXHIBIT No. 12

Branch offices of contract-construction establishments, 1929¹

Establishments with no branches.....	28, 660
Establishments reporting branches.....	1, 369
1 or 2 branches.....	1, 189
3 to 5 branches.....	136
6 to 10 branches.....	22
11 to 20 branches.....	17
21 branches or more ²	5
Establishments reporting themselves as branches.....	568
Total establishments.....	30, 597

¹ Includes only establishments doing more than \$25,000 worth of business during 1929.

² These 5 establishments averaged 140 branches each. Most establishments reporting a large number of branches were manufacturers or distributors of specialized products or building equipment which they also installed.

Source: Fifteenth Census of the United States, 1930, Construction Industry, p. 15.

EXHIBIT No. 13

Membership in trade associations of contract-construction establishments whose volume of business exceeded \$25,000 in 1929

	Percent of all reporting establishments
No membership.....	53. 8
Membership in national association only.....	5. 5
Membership in local association only.....	23. 8
Membership in both local and national associations.....	16. 9
Total.....	100. 0

Source: Fifteenth Census of the United States, 1930, Construction Industry, p. 17.

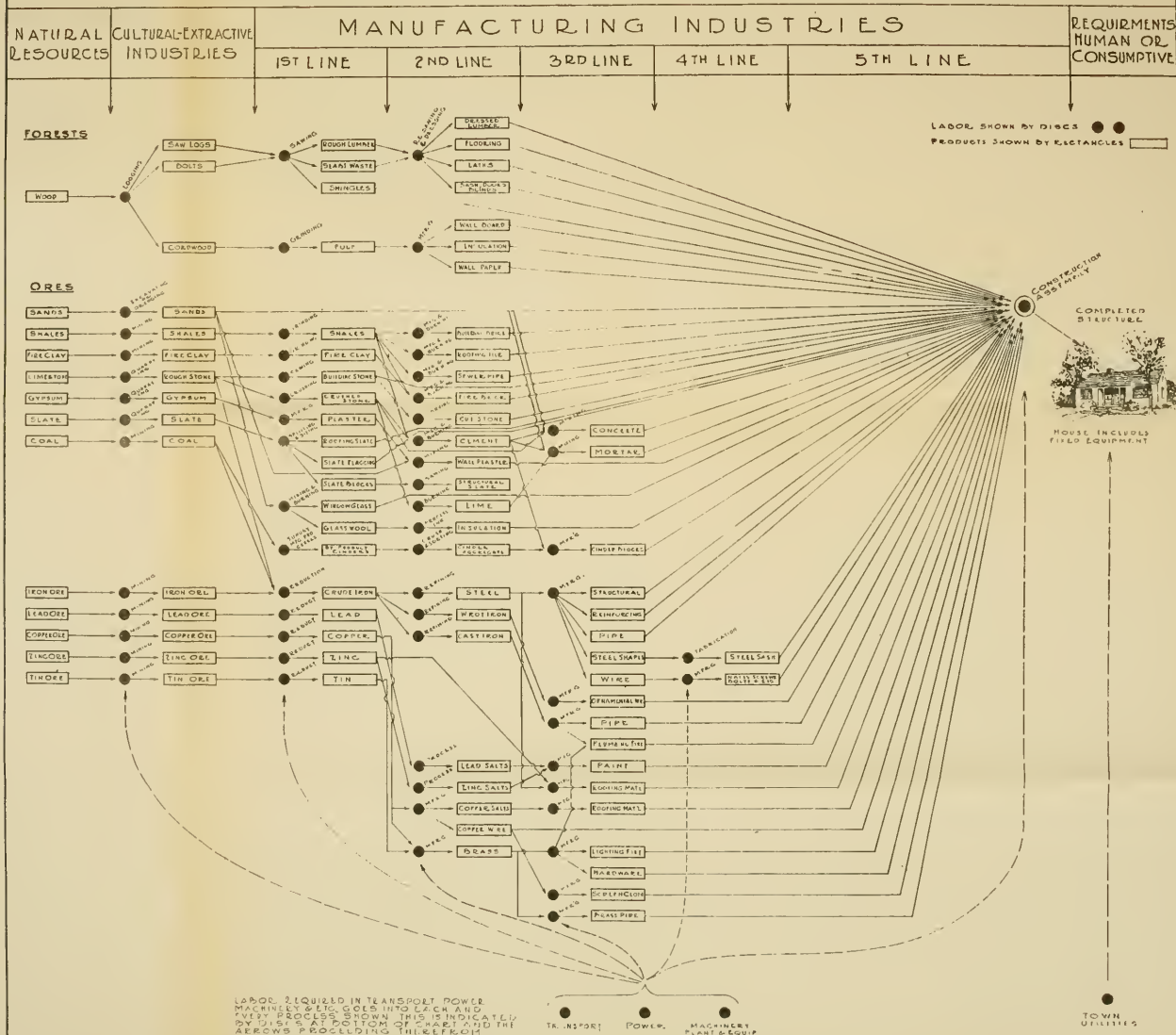
EXHIBIT No. 14

The following table shows the wide variety of trade associations operating directly or indirectly in the construction industry. Each group in the industry has its own separate trade associations, with little coordination among them. Most of the contractors' associations have less than a 40-percent coverage of their particular group in the industry, as indicated by the second table following.

Number of national and interstate trade associations in the construction field classified by major industrial groups, 1938

Industrial group:	
Building construction—general contractors.....	1
General contractors—other than building.....	2
Special trade contractors.....	11
Nonmetallic mining and quarrying.....	2
Textile products.....	3
Lumber and timber basic products.....	31
Finished lumber products.....	3
Paper and allied products.....	1
Chemicals and allied products.....	3
Products of coal, petroleum and natural gas.....	3
Stone, clay and glass products.....	28

LABOR PROCESSES REQUIRED IN HOUSE CONSTRUCTION



Number of national and interstate trade associations in the construction field classified by major industrial groups, 1938—Continued

Industrial group—Continued.

Iron and steel and their products.....	42
Transportation equipment.....	1
Nonferrous metals and their products.....	1
Electrical apparatus and supplies.....	5
Machinery except electrical.....	9
Miscellaneous manufacturing.....	1
Wholesale trade.....	23
Retail hardware.....	8
Retail lumber and building supplies.....	7

Total..... 185

Source: Bureau of Foreign and Domestic Commerce.

Number of national and interstate regional trade associations in the construction field classified according to the percent which their membership represents of the total number of firms in the industries covered by them, 1937-38¹

Percent of industry firms represented ²	All associations		Associations of producers		Associations of distributors		Associations of contractors	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All associations.....	169	100.0	121	100.0	36	100.0	12	100.0
Less than 20.....	30	17.8	21	17.4	3	8.3	6	50.1
20-30.....	29	17.2	23	19.0	3	8.3	3	25.0
40-59.....	32	18.9	21	17.4	10	27.8	1	8.3
60-79.....	50	29.7	34	28.0	15	41.7	1	8.3
80-100.....	28	16.4	22	18.2	5	13.9	1	8.3

¹ Based on returns from 169 of 185 national and regional interstate trade associations defined within the construction field. In some cases the data cover the year 1937, in others, 1938.

² Industry means the group defined by the association for voting membership purposes.

Source: Bureau of Foreign and Domestic Commerce.

EXHIBIT No. 15

By 'low productivity' in the building industry is not meant simply low productivity at the site of construction. Final costs are determined by the entire production process, of which site construction represents approximately one-third. Throughout the entire process, from the original source of materials in forests, mines, and quarries, labor represents (in terms of dollars) from 72 to 89 percent of the cost of a house. Productivity must be increased throughout the entire process before costs of housing can be substantially lowered.

The extent and complexity of the labor processes which enter into the building of a house are clearly illustrated on chart XX. To reduce costs, labor operations cannot simply be shifted from direct on-the-site work to factory work without reducing the total per unit of product. It should be emphasized also that increased productivity in the building industry will bring more work and not less, because of the expanded market which will result from lower costs. But the labor per housing unit will be lower.

EXHIBIT No. 16

Productivity in blast furnaces, 1929

Item	Number of establishments	Average output per man-hour	Wages	
			Per ton	Per man-hour
Output per man-hour:		<i>Tons</i>		
Under 0.200 tons.....	9	0.145	\$2.55	0.37
0.200 to 0.399 tons.....	22	.341	1.44	.49
0.400 to 0.599 tons.....	18	.504	1.28	.64
0.600 to 0.799 tons.....	17	.665	.87	.58
0.800 to 0.999 tons.....	13	.869	.67	.58
1.000 tons and over.....	7	1.313	.58	.77
Wages per man-hour:				
Under 30 cents.....	5	.091	2.18	.20
30 to 39.9 cents.....	8	.309	1.15	.36
40 to 49.9 cents.....	15	.512	.87	.45
50 to 59.9 cents.....	31	.611	.90	.56
60 to 69.9 cents.....	14	.591	1.08	.64
70 to 79.9 cents.....	9	.743	.99	.74
80 cents and over.....	4	1.026	.99	1.02

Source: Monthly Labor Review, Bureau of Labor Statistics, August 1932, p. 264.

EXHIBIT No. 17

Index of productivity in the electric-lamp industry

[1920=100]

Classification	1920	1929	1931
All classes of the industry.....	100	340	329
Lamp assembly plants.....	100	448	457
Manufacturing of parts.....	100	349	324
Equipment divisions.....	100	166	167
Nonmanufacturing divisions.....	100	192	175

Source: Handbook of Labor Statistics (1936 ed.), Bureau of Labor Statistics, p. 719.

EXHIBIT No. 18

Index of productivity in the automobile-tire industry

[1914=100]

Year	Output per man-hour		Year	Output per man-hour	
	Tires	Pounds		Tires	Pounds
1914.....	100.0	100.0	1927.....	392.4	417.9
1922.....	279.4	250.6	1928.....	417.1	465.6
1923.....	311.7	272.7	1929.....	428.7	506.3
1924.....	328.5	282.2	1930.....	455.4	581.0
1925.....	317.7	305.8	1931.....	547.2	681.1
1926.....	366.0	366.0			

Source: Bulletin No. 585, Bureau of Labor Statistics, July 1933.

EXHIBIT No. 19

Index of productivity in leather industry

[1935=100]

Year:	Production per man- hour	Year—Continued.	Production per man- hour
1849.....	25	1919.....	56
1859.....	26	1921.....	76
1869.....	35	1923.....	78
1879.....	52	1925.....	75
1889.....	55	1927.....	81
1899.....	53	1929.....	79
1904.....	52	1931.....	84
1909.....	54	1933.....	88
1914.....	62	1935.....	100

300 percent increase since 1849; 89 percent increase since 1899.

Source: Monthly Labor Review, Bureau of Labor Statistics, July 1937, p. 73.

EXHIBIT No. 20

It is extremely difficult to measure the degree of mechanization in the construction industry. One effort to do so is reported by Harry Jerome in *Mechanization in Industry*, which was published by the National Bureau of Economic Research in 1934. The following statement summarizes his experience and results:

To obtain data concerning changes over a specific period of time is unusually difficult in the case of contracting operations. The scene and type of operations shift, the staff personnel changes, records are negligible, the memories of foremen and other executives are none too certain. * * * However, our inspectors did obtain statements from 49 contractors on the 100 construction operations surveyed, giving the labor-saving changes, if any, made in their methods of operation between 1920 and the time of inquiry in 1925 * * * 27, or over half of the group reporting, disclaimed having made any labor-saving changes in this period, I remarking, "I have not bought a new machine for 10 years."

The following table and chart give a fair indication of the relative degree of mechanization among the different types of contractors in the construction industry, in terms of dollar value of equipment owned by them at the end of 1929. The table shows both the average value per establishment and the average value per employee (average for the year), while the chart shows only the average per employee. By either measure, establishment or employee, the building branch of construction industry operates with much less equipment than other branches.

Average inventory value of equipment in the construction industry by class of establishment, 1929¹

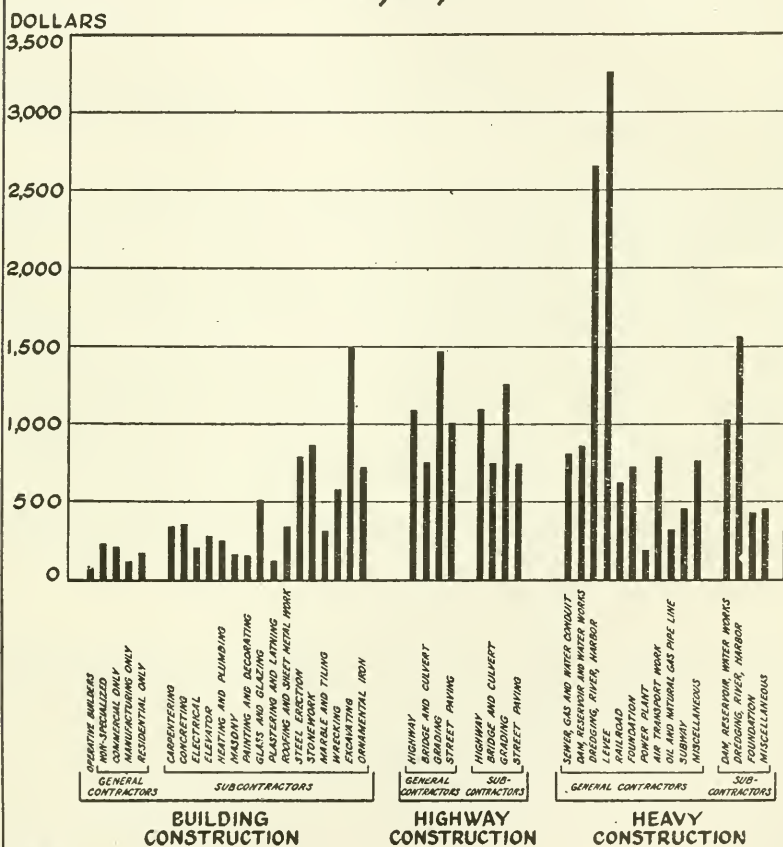
Class of establishment	Value of equipment per establishment	Value of equipment per employee	Class of establishment	Value of equipment per establishment	Value of equipment per employee
BUILDING CONSTRUCTION			HIGHWAY CONSTRUCTION—Continued		
Operative builders.....	\$1,008	\$68	Subcontractors:		
General contractors:			Highway.....	\$26,480	\$1,098
Nonspecialized.....	8,117	229	Bridge and culvert.....	22,692	747
Commercial only.....	5,164	211	Grading.....	31,196	1,263
Manufacturing only.....	13,397	115	Street paving.....	22,313	742
Residential only.....	1,726	175	HEAVY CONSTRUCTION		
Subcontractors:			General contractors:		
Carpentering.....	4,516	341	Sewer, gas, and water conduit.....	38,546	807
Concreting.....	10,271	358	Dam, reservoir, and waterworks.....	53,917	862
Electrical.....	2,879	209	Dredging, river, harbor.....	278,630	2,655
Elevator.....	11,848	285	Levee.....	117,929	3,263
Heating and plumbing.....	3,338	254	Railroad.....	110,333	621
Masonry.....	4,053	169	Foundation.....	18,981	729
Painting and decorating.....	2,850	161	Power plant.....	51,950	191
Glass and glazing.....	4,740	509	Air transport work.....	67,000	790
Plastering and lathing.....	3,386	126	Oil and natural gas pipeline.....	86,850	321
Roofing and sheet-metal work.....	4,406	347	Subway.....	186,923	464
Steel erection.....	32,136	788	Miscellaneous.....	58,834	765
Stonework.....	21,917	861	Subcontractors:		
Marble and tiling.....	5,663	315	Dam, reservoir, waterworks.....	17,500	1,029
Wrecking.....	14,400	579	Dredging, river, harbor.....	41,833	1,569
Excavating.....	42,696	1,491	Foundation.....	60,400	431
Ornamental iron.....	9,154	722	Miscellaneous.....	15,124	434
HIGHWAY CONSTRUCTION					
General contractors:					
Highway.....	58,974	1,091			
Bridge and culvert.....	38,809	750			
Grading.....	44,898	1,473			
Street paving.....	44,011	1,005			

¹ Figures represent the average inventory value of equipment as reported by construction establishments doing more than \$25,000 worth of business during 1929. Value per employee is calculated on the basis of the average of employees in all reporting establishments during the year divided by the total value of equipment for those establishments.

Source: Fifteenth Census of the United States, 1930, Construction Industry, pp. 96 and 101.

CHART XXI

AVERAGE INVENTORY VALUE OF EQUIPMENT PER EMPLOYEE IN THE CONTRACT CONSTRUCTION INDUSTRY 1929



Percent of equipment used which is owned, 1929

Percent owned	Number of establishments	
	General contractors	Subcontractors
None.....	1,030	485
1 to 25 percent.....	253	62
26 to 50 percent.....	293	89
51 to 75 percent.....	464	176
76 to 99 percent.....	2,159	680
100 percent.....	9,270	10,917
Not reported.....	428	412
Total.....	13,897	12,821

Source: Fifteenth Census of the United States, 1930, Construction Industry, p. 96.

EXHIBIT No. 21

A few examples of union restrictions upon apprentices are listed below. There are many such cases, and these are listed only to indicate their nature.

AGREEMENT BETWEEN INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS AND THE ELECTRICAL CONTRACTORS ASSOCIATION OF NEW YORK CITY. IN EFFECT DECEMBER 31, 1938

There shall not be more than one apprentice to each three journeymen employed. There shall not be more than five apprentices on any job.

WORKING RULES OF THE UNITED BROTHERHOOD OF CARPENTERS AND JOINERS LOCAL 1207, CHARLESTON AND VICINITY, W. VA. IN EFFECT APRIL 30, 1939

The number of apprentices to be employed at any time shall be one to five men, but not over two shall be allowed to any one employer.

WORKING RULES OF THE UNITED BROTHERHOOD OF CARPENTERS AND JOINERS, DISTRICT COUNCIL OF NEW YORK CITY

Only 1 apprentice shall be allowed to 10 men, and the age of such apprentice at beginning of apprenticeship shall be between the ages of 17 and 22 years.

WORKING RULES OF THE UNITED BROTHERHOOD OF CARPENTERS AND JOINERS, LOS ANGELES COUNTY DISTRICT COUNCIL

The term "apprentice" means a young man learning the trade between the age of 17 and 22. Employers will be allowed 1 apprentice for the first 4 journeymen on the job and 1 apprentice for each 10 additional journeymen. Apprentices shall serve 4 years at the trade.

WORKING RULES OF THE UNITED BROTHERHOOD OF CARPENTERS AND JOINERS, LOCAL 183, PEORIA, ILL.

If a contractor employs 10 men or more at all times, he shall be allowed 2 apprentices.

EXHIBIT No. 22

The full text of the statements referred to in the text regarding Baltimore and Pittsburgh plumbers are as follows:

AGREEMENT BETWEEN JOURNEYMAN PLUMBERS LOCAL UNION No. 27 OF PITTSBURGH AND VICINITY AND THE PLUMBING CONTRACTORS' ASSOCIATION OF PITTSBURGH. IN EFFECT TO MAY 31, 1940

Any fixture coming on the job with trimmings already in place on the fixture shall not be installed by the members of Local Union No. 27 until said trimmings have been removed and replaced by the members of Local Union No. 27.

AGREEMENT BETWEEN PLUMBERS AND GASFITTERS LOCAL No. 48 AND THE PLUMBING CONTRACTORS' ASSOCIATION OF BALTIMORE. IN EFFECT TO MAY 1, 1940

No fixtures coming on the job with trimmings already in place shall be installed by members of Local No. 48 until said trimmings have been removed and replaced by members of Local Union No. 48. This does not include dental units or other types of fixtures in which the trimmings are an integral part of same.

EXHIBIT No. 23

The full text of the jurisdictional agreement over the installation of Acoustone, as it appears in the Report of Proceedings of the Thirty-Third Annual Convention of the Building and Construction Trades Department, American Federation of Labor, September 1939, is as follows:

At a meeting of the joint conference between the executive boards of the Bricklayers, Masons and Plasterers' International Union of America and the Operative Plasterers and Cement Finishers' International Association of the United States and Canada, held in Atlantic City, February 27, 1930, it was agreed that the above-named material (Acoustone) and those of a similar character shall be installed on a 50-50 basis equally divided between the membership of the Operative Plasterers and Cement Finishers' International Association of the United States and Canada and the Bricklayers, Masons and Plasterers' International Union of America, irrespective of thickness.

EXHIBIT No. 24

Actual time reductions on various carpenter operations which were achieved through application of adequate planning and production standards to a housing project near Baltimore, built under the engineering direction of the Thompson & Lichtner Co., were as follows:

	Percent		Percent
Erect nonbearing partition-----	25	Finish flooring-----	36
Diagonal wall sheathing-----	32	Framing-----	29
Wall furring-----	30	Setting floor joists-----	34

Source: System Can Cut Building Costs, Sanford E. Thompson and W. E. Curley, Nation's Business, January 1939.

EXHIBIT No. 25

Through application of production planning to the Southwest Portland Cement Co. project of 30 houses at Victorville, Calif., production time was cut in the amounts shown below for the various operations. Three basic methods of planning were used: (1) Complete rationalization of the product and its parts before work was started; (2) smooth flowing assembly involving a minimum of waste effort and stops; (3) tab-keeping of work as a continuous check on efficiency.

Savings through planning on 30-house project

Item:	Percent time on last house was of first house	Item—Continued.	Percent time on last house was of first house
Excavations.....	27	Ceiling framing.....	93
Foundations.....	51	Roof framing.....	57
Floors.....	44	Electric wiring.....	25
Walls.....	60	Garages.....	46
Fireplaces.....	35		
Window and door frames.....	48	Complete house structure ¹	47

¹ Does not include finish except electric wiring.

Source: Architectural Forum, March 1939, p. 231.

EXHIBIT No. 26

The detailed data regarding several of the cases involving building materials dealers before the Federal Trade Commission as set forth below were taken from the official records of the Commission and are available to the public.

IN THE MATTER OF BUILDING MATERIAL DEALERS' ALLIANCE, PITTSBURGH BUILDERS' SUPPLY CLUB, BUILDING MATERIAL INSTITUTE, WESTERN PENNSYLVANIA BUILDERS' SUPPLY ALLIANCE, ALLIED CONSTRUCTION INDUSTRIES OF CLEVELAND, INC., LIME & CEMENT EXCHANGE OF BALTIMORE CITY, MIDDLE ATLANTIC COUNCIL OF BUILDERS' SUPPLY ASSOCIATIONS, MARYLAND BUILDERS' SUPPLY ASSOCIATION, NATIONAL FEDERATION OF BUILDERS' SUPPLY ASSOCIATIONS, RESPONDENTS

Cease and desist order issued by Federal Trade Commission, December 30, 1937, Docket No. 2191.

Building Material Dealers' Alliance was organized in 1931 as a voluntary trade association. Its membership consisted of (a) over 150 dealers in building materials and builders' supplies, doing business in the Cleveland-Pittsburgh trade area; and (b) organized local associations or units of such dealers. The Cleveland-Pittsburgh area is one of the largest markets in the country for the sale of building materials and supplies, and the business of the dealer members of the Alliance represented the preponderance of business in building materials in this market.

Pittsburgh Builders' Supply Club was a corporation whose members were, with few exceptions, also members of the Building Material

Dealers' Alliance. Said members were the largest business firms in the building and material industry in Pittsburgh, and sold over 75 percent of the builders' supplies sold in Pittsburgh and the metropolitan area.

Building Material Institute was an unincorporated trade association with headquarters in Cleveland. Its members were, with few exceptions, also members of the Building Material Dealers' Alliance.

Western Pennsylvania Builders' Supply Alliance was organized in 1932, and was affiliated with the Building Material Dealers' Alliance and the National Federation of Builders' Supply Associations. Its members sold the preponderance of building materials and supplies in Western Pennsylvania.

Allied Construction Industries of Cleveland, Inc., was a corporation whose members included dealers in building materials and supplies in Cleveland who were also members of the Building Material Dealers' Alliance.

Lime & Cement Exchange of Baltimore City was organized in 1898 as a Maryland corporation. Its members were dealers in building materials and supplies in the Baltimore trade area. It was affiliated with the National Federation of Builders' Supply Associations and the Middle Atlantic Council of Builders' Supply Associations.

Middle Atlantic Council of Builders' Supply Associations was an unincorporated trade association organized in 1934, and consisted of eight builders' supply associations whose members were engaged in business as dealers of building materials and supplies in the Middle Atlantic States, including Pennsylvania, Delaware, Maryland, New Jersey, Virginia, and the District of Columbia.

Maryland Builders' Supply Association was organized in 1934. Its members were dealers in building materials and supplies in Western Maryland. It was affiliated with the Middle Atlantic Council of Builders' Supply Associations, and the National Federation of Builders' Supply Associations.

National Federation of Builders' Supply Associations was a corporation organized in 1933 whose membership consisted of forty-one units located in approximately thirty-two States throughout the United States.

BASIC OBJECT AND PURPOSE

The basic object and purpose of the Building Material Dealers' Alliance program, which all the respondents actively cooperated in maintaining, was to control and confine the retail distribution of building materials and builders' supplies exclusively through recognized dealers, and to prevent the direct sale of materials and supplies by manufacturers to all others: consumers, nonrecognized dealers, vendors, contractors, and State Governments and other political subdivisions; and to require all such purchasers to purchase their materials and supplies through recognized dealer channels upon terms or conditions of sale which afforded a commission or profit to the recognized dealers.

The National Federation of Builders' Supply Associations was formed to apply on a national scale the above program of the Alliance under the same leadership with headquarters at Pittsburgh. Its directors in 1934 adopted the following resolution to enforce their

program, and dealer-members were requested to hang the declaration in their offices:

We resolve, therefore, that whenever possible, we will hereafter purchase builders supplies from those manufacturers or producers of builders supplies who merchandise their products to dealers in builders supplies, when sold for use within a recognized marketing area which is constantly and regularly served by dealers or from those manufacturers who comply with the provisions of the Code of Fair Competition for the Builders Supply Trade.

In practice, manufacturers who sold to other than recognized dealers were effectively boycotted by members of the various associations named above. The Federal Trade Commission stated in its Findings of Fact:

Manufacturers and producers of building material and builders' supplies in the various States who sell and distribute their products in the markets where respondent dealers have their places of business have quite generally confined such sale and distribution to the recognized dealers. Said manufacturers and producers received from respondents membership lists, together with official letters containing implied boycotts and threats of boycotts against the products of said manufacturers and producers unless their distribution was confined to the dealers recognized by respondents.

Manufacturers and producers were injured in their business by restriction of demand for their products and of freedom to sell same direct by confining their sales to the lists of dealers published and distributed by the respondents; in order not to incur "pressure" and "combined" or "concerted" action of respondents against them, they would not sell to many to whom they wanted to sell and considered as dealers; neither would they sell direct to consumers, contractors, vendors, Government and its political subdivisions, but had to limit their sales through "recognized dealer distribution."

Order to cease and desist from the above and other enumerated practices was issued by the Federal Trade Commission on December 30, 1937.

IN THE MATTER OF CALIFORNIA LUMBERMEN'S COUNCIL, COAST COUNTIES LUMBERMEN'S CLUB, CENTRAL VALLEY LUMBERMEN'S CLUB, NORTHERN COUNTIES LUMBERMEN'S CLUB, PENINSULA LUMBERMEN'S CLUB, SAN JOAQUIN LUMBERMEN'S CLUB, RESPONDENTS

Cease and desist order issued by Federal Trade Commission, July 23, 1938, Docket No. 2898.

Members of the above organizations constituted a large and important part of the dealers in lumber and building materials in California, and were sufficiently influential in the trade as to substantially influence and affect the flow of lumber and building materials within and to the various trade areas in the territories where they operated.

BASIC OBJECT AND PURPOSE

As stated by the Commissioner

The primary objective of the respondents which they actively cooperated in maintaining, was to control and confine the retail distribution of lumber and building materials exclusively through the members of the respondent organizations and to prevent the direct sale of lumber and building materials by manufacturers, producers, or wholesalers to all others, namely nonmember dealers, vendors, contractors, consumers, and other purchasers, including state and political subdivisions.

Further objectives of the respondents were (a) to limit the sale and distribution of lumber and building materials by the dealer members to districts in which the said dealer members have their places of business; (b) to prevent other dealers

from selling lumber and building materials in the trading area where a dealer member is located; (c) at least two of said respondent organizations, to wit, Coast Counties Lumbermen's Club and the Northern Counties Lumbermen's Club, through their officers or representatives, fixed and prepared price lists to be observed by their members in the respective territories of the said two respondent organizations.

The respondent, Coast Counties Lumbermen's Club, fixed and determined the quota of sales which a manufacturer, producer, or wholesaler could make monthly in the territory of said respondent organization, and also fixed and determined the quota of business which a dealer member of said organization could do.

To enforce their program, manufacturers, producers, and wholesalers who sold to nonmembers were boycotted by the members of the associations.

The Commission found that:

Manufacturers, producers, and wholesalers were injured in their business by restriction of demand for their products and of freedom to sell same direct, by the pressure and concerted action of the respondents to have sales confined to the respondent members of the respondent organizations. In many instances, manufacturers and wholesalers, in response to the demand of certain of the respondent organizations, paid penalties or commissions to respondents on direct sales made by said manufacturers and wholesalers to purchasers whose names did not appear on respondents' roster.

Costs to the consuming public were increased in certain territories by the issuance of price lists and by respondents' policy of exclusive dealer member distribution, because the consuming public was thereby denied the advantages in price which it otherwise would have obtained in the natural flow of commerce under conditions of free competition.

Order to cease and desist from the above and other enumerated practices was issued by the Federal Trade Commission on July 23, 1938.

IN THE MATTER OF FLORIDA BUILDING MATERIAL INSTITUTE, INC. (ITS OFFICERS AND DIRECTORS), RESPONDENTS

Cease and desist order issued by Federal Trade Commission, September 10, 1938, Docket No. 2857.

The Florida Building Material Institute, Inc., was a corporation organized in 1934 with headquarters in Orlando, Florida. Its members included approximately 280 retail dealers who were engaged in the distribution of lumber, lumber products, building materials, builders' supplies and millwork in Florida. Its members controlled approximately 70 percent of the market for such materials in Florida. Its membership included also "associate members" consisting of about 47 manufacturers, producers, and wholesalers in the building-supply industry, most of whom had their places of business outside the State of Florida. In addition to these active and associate members there were approximately 288 cooperating manufacturers, producers, and wholesalers who conformed to the policies of the Institute.

BASIC OBJECTIVE AND PURPOSE

The Institute was organized—

(a) To establish the active members of the said Institute and the cooperating dealers as a class of recognized dealers in lumber products, building materials and builders' supplies in the State of Florida, and to control and confine the sale and distribution of said products by manufacturers and producers thereof to or through the medium of such respondent members and cooperating dealers exclusively.

(b) To require the associate members of said Institute and other manufacturers, producers and wholesalers of lumber, lumber products, building materials and builders' supplies, to refrain from selling or distributing said products to dealers or other purchasers who were not recognized by the Institute as cooperating with its policies, but who were in competition in the retail sale and distribution of said products with the active members of said Institute and the cooperating dealers.

(c) To prevent the nonrecognized and noncooperating dealers from purchasing or securing lumber, lumber products, building materials and builders' supplies direct from manufacturers, producers and wholesalers.

(d) To interfere with the business and trade of nonrecognized and noncooperating dealers for the purpose of enabling or assisting the dealer members of said Institute and the cooperating dealers to appropriate and acquire said business and trade and to obstruct the competition of such nonrecognized and noncooperating dealers.

(e) To monopolize the business and trade in lumber, lumber products, building materials and builders' supplies in the State of Florida in the members of said Institute and those who were cooperating with the Institute in maintaining its policies.

The Institute effectively enforced its program by boycotting and threatening to boycott manufacturers, producers, and wholesalers unless their distribution was confined to active and cooperating members of the Institute. The Commission found that—

Manufacturers, producers, and wholesalers, located in various states of the United States, have refused to sell, or have discontinued selling, to dealers or other purchasers who were found and reported by the Institute to be noncooperating with the Institute's policies. Shipments to noncooperating dealers or other purchasers which manufacturers wanted to make were refused and cancelled because of intimidation and coercion by the Institute and its officials.

Order to cease and desist from the above and other enumerated practices was issued by the Federal Trade Commission on September 10, 1938.

EXHIBIT No. 27

Number of people engaged in retail distribution of building materials and new automobiles, 1935

Kind of business	Total	Number of active proprietors and firm members	Number of employees ¹
Building materials ²	253, 829	60, 157	193, 672
Motor vehicles (new) ³	282, 638	25, 484	257, 151

¹ Includes both full-time and part-time employees, average for the year.

² Includes census classifications: lumber and building material dealers; hardware stores; hardware and farm-implement dealers; heating and plumbing equipment dealers; paint, glass, and wallpaper stores; and electrical supply stores.

³ In addition to new-car dealers, there are many used-car dealers, garages, and dealers in accessories which are not included in the new-car figures.

Source: Census of Business, 1935, Retail Distribution, vol. 1, p. 2-04.

EXHIBIT No. 28

Listed below are the indictments which were returned and the civil suits which were instituted from October 12, 1939, to February 23, 1940, in the building industry under the current program of the Department of Justice under the antitrust laws:

INDICTMENTS

Title of case	Court	Cause
<i>U. S. v. E. L. Bruce Company, Inc., et al.</i>	Northern district, California.	Fixing of prices on hardwood flooring.
<i>U. S. v. Building and Construction Trades Council of New Orleans, La., et al.</i>	Eastern district, Louisiana.	Refusal to accept shipments of building materials and fixtures on projects where members of defendant unions are employed, when such shipments are transferred by members of United Transport Workers, Local Industrial Union No. 806.
<i>U. S. v. Cadillac Electric Supply Co., et al.</i>	Eastern district, Michigan.	Fixing of prices on electrical supplies and dictating terms for sale thereof.
<i>U. S. v. Engineering Survey & Audit Company, Inc., et al.</i>	Eastern district, Louisiana.	Maintenance of noncompetitive prices on electrical materials through collusive bidding.
<i>U. S. v. Glaze-Rite, et al.</i> (including union representatives).	Northern district, Ohio.	Monopoly over glazing in Cleveland.
<i>U. S. v. William L. Hutcheson, et al.</i>	Eastern district, Missouri.	Jurisdictional dispute between carpenters' and machinists' unions over installation and removal of machinery in plant of Anheuser-Busch, Inc.
<i>U. S. v. Long Island Sand & Gravel Producers' Association, et al.</i>	Southern district, New York.	Fixing prices and establishing uniform terms for the sale of sand and gravel.
<i>U. S. v. Master Plasterers' Association of San Francisco, et al.</i> (including labor union).	Northern district, California.	Regulation and control of bids on plaster and gypsum.
<i>U. S. v. Mosaic Tile Company, et al.</i> (including labor union).	Northern district, Illinois.	Prevention of companies in Chicago area other than those selected from purchasing tile.
<i>U. S. v. San Francisco Electrical Contractors' Association, Inc., et al.</i> (including labor union).	Northern district, California.	Regulation and control of bids on electrical equipment.
<i>U. S. v. San Francisco Hardwood Floor Contractors' Association, et al.</i>	-----do-----	Fixing prices on installation and repair of hardwood flooring.
<i>U. S. v. Sheet Metal Association, Inc.</i>	Eastern district, Louisiana.	Fixing prices for sheet-metal work, roofing, and air conditioning and adjusting bids thereon.
<i>U. S. v. Wheeling Tile Company, et al.</i> (including labor unions).	Eastern district, Michigan.	Monopoly on purchase of tile in Detroit area.
<i>U. S. v. Drivers, Chauffeurs, and Helpers Local Union No. 639 of the International Brotherhood of Teamsters, Chauffeurs, Stablemen & Helpers of America, et al.</i>	District of Columbia.	Interference with various companies operating "mixer" concrete trucks by strikes, boycotts, and violence to compel employment as drivers and operators only members of defendant union.
<i>U. S. v. International Longshoremen's Association, et al.</i>	Southern district, New York.	Interference with interstate shipments of lumber to retailers whose employees were members of C. I. O., to induce them to coerce their employees to join defendant union.
<i>U. S. v. Arthur Morgan Trucking Co., et al.</i> (including labor union).	Eastern district, Missouri.	Interference with hauling of building and construction materials, supplies and equipment to eliminate certain haulers from competition with defendant company, and maintaining artificially high and noncompetitive prices.
<i>U. S. v. Chicago and Cook County Building and Construction Trades Council, et al.</i>	Northern district, Illinois.	Prevention of organization located in the Chicago area from purchasing limestone fabricated in the Bedford-Bloomington, Ind., district.
<i>U. S. v. William F. Hess, et al.</i> (including union members).	Eastern district, Pennsylvania.	Conspiracy to defraud United States in connection with bids on contracts for public works.
<i>U. S. v. New Orleans Chapter, Associated General Contractors of America, Inc., et al.</i>	Eastern district, Louisiana.	Conspiracy to defraud United States in connection with the building of the Charity Hospital, New Orleans, La.
<i>U. S. v. The Simes Co. Inc., et al.</i>	Southern district, New York.	8 indictments were returned against these 4 companies engaged in manufacturing or assembling and supplying electrical equipment in New York City. 6 indictments charged diverting P. W. A. funds; 2 charged conspiracy to defraud United States on numerous P. W. A. building projects.
<i>U. S. v. McPhilben Manufacturing Co., Inc., et al.</i>		
<i>U. S. v. Weiss De Veau Company, Inc., et al.</i>		
<i>U. S. v. Shapiro & Aronson, Inc., et al.</i>	Northern district, Illinois.	Refusal of members to work on products of the Harbor Plywood Corporation (plywood) which employed members of Local 2521 the International Woodworkers of America (C. I. O.).
<i>U. S. v. United Brotherhood of Carpenters and Joiners of America, et al.</i>		
<i>U. S. v. Beardslee Chandelier Mfg. Co., et al.</i> (including 5 electrical companies, and International Brotherhood of Electrical Workers, Local No. 134).		Prevent electrical companies in Chicago area from purchasing electrical fixtures manufactured outside Illinois by refusal of union and members to install fixtures not bearing union fabricating label.

INDICTMENTS—Continued

Title of case	Court	Cause
<i>U. S. v. Southern Pine Association et al.</i> (New Orleans, La.).	Louisiana.....	Abuse of promotion of grade marking of lumber to exclude nonmembers of association from lumber markets.
<i>U. S. v. Lumber Institute of Allegheny County et al.</i> (including, 2 trade associations, 2 unions, and 21 lumber dealers).	Pennsylvania.....	Prevention of use of out-of-State lumber products in Pittsburgh by withholding union label.

CIVIL SUITS

<i>U. S. v. Excavators Administrative Association, Inc., et al.</i>	District of Columbia....	Elimination of competitive bidding by excavating contractors.
<i>U. S. v. New Orleans Chapter of the Associated General Contractors of America, Inc.</i>	Eastern District, Louisiana.	Maintaining prices on construction work.
<i>U. S. v. Plumbing & Heating Industries Administrative Association, Inc., et al.</i> (including union members).	District of Columbia....	Elimination of competitive bidding among plumbing and heating contractors.
<i>U. S. v. Union Painters Administrative Association, Inc., et al.</i>	-----do-----	Elimination of competitive bidding among painting contractors.
<i>U. S. v. Voluntary Code of the Heating, Piping and Air Conditioning Industry for Allegheny County, Pa., et al.</i> (including labor union).	Western District, Pennsylvania.	Operation of bid depository for the purpose of fixing and maintaining prices of heating equipment and installations.
<i>U. S. v. Sheet Metal Association, Inc.</i>	Eastern District, Louisiana.	Fixing and maintaining prices for sheet-metal work, roofing, and air conditioning, and adjusting bids to conform to such agreed-upon prices.

EXHIBIT No. 29

(Copyright 1940 by The Christian Science Publishing Society—January 10, 1940)

OUTLAY FOR RESEARCH \$215,000,000 IN 1939—SOME 2,000 INDUSTRIAL CONCERNS IN UNITED STATES SPENT HUGE SUM TO IMPROVE PRODUCTS OR REDUCE THEIR COSTS—MUCH OF EXPENSE WILL POUR BACK INTO TILLS AS PROFIT DURING 1940 AND 1941

(By the Natural Science Editor of The Christian Science Monitor)

PITTSBURGH.—It cost 2,000 industrial concerns of the United States \$215,000,000 during 1939 to learn how to change coal and air into silk-like hosiery; how to make tires wear longer; how to take the static out of radio; how to make safety glass that is really safe; how to get more miles a gallon and less knocks a mile out of gasoline; how to make new perfumes and dyes; and how to cut the cost of 99,999 articles everyone buys at the local department store, hardware emporium, or five-and-dime.

Industry paid this bill, according to Dr. William A. Hamor, associate director of Mellon Institute of Industrial Research, who has just completed a world survey for the American Chemical Society, but in many cases the entire investment will be returned in 1940 or 1941.

The United States is not alone in the employment of applied research invention, and product engineering, the report discloses. Novel synthetics, says Dr. Hamor, have opened up a new era throughout the civilized world for solvents, plastics, paints, perfumes, and similar products. Hundreds of investigations are underway, his survey shows, in Canada, Great Britain, Germany, France, Italy, India, Japan, Hungary, Sweden, Switzerland, Soviet Russia, Australia, Austria, Brazil, Chile, Denmark, Norway, and several Central and South American countries.

1939 BUSY YEAR

"The year 1939 was one in which applied science increased its usefulness almost everywhere," the report stated.

"In the United States industrial research has a pleasant thoroughfare, along which it has kept advancing. The principal results of its progress in 1939 are seen in the field of synthetic organic chemistry, including hydrocarbon derivatives, fine chemicals, plastics, and textile fibers.

"The chemical, petroleum, and electrical laboratories employed nearly half of the 32,000 scientists and engineers engaged in industrial research, while 16,000 additional persons served as assistants or clerical workers.

"The petroleum industry, always science-minded, has kept pace with the requirements of aviation by speedily making available satisfactory and adequate gasoline for airplane use. Metallurgy, glass technology, and building science have been helped forward by numerous improvements. In other countries, especially Great Britain, France, Italy, and Germany, the main subjects of research have been basically similar and, as in the United States, the most impressive strides have occurred in plastics technology."

Among the chemical manufacturing concerns with large investigational expenditures during 1939 were E. I. du Pont de Nemours & Company, Wilmington, Del., with a research budget totaling \$7,000,000, and the Dow Chemical Company, Midland, Mich., which devoted \$1,400,000 to research.

"About 110 individual companies in the field of chemical industry and 40 trade associations are making research grants to educational institutions," Dr. Hamor reported. "There are approximately 200 college laboratories that are used not only for purposes of instruction but also to a considerable extent for industrial research work and for commercial testing."

LONG-RANGE SURVEY

"About 250 manufacturing corporations are sustaining long-range investigations in research foundations. A considerable number of companies, mostly small concerns that have no laboratories of their own, or larger companies that encounter few problems or are engaging in research for the first time, are regular or occasional clients of consulting laboratories. There are said to be 250 of these commercial laboratories in the country, and some are strongly staffed and excellently equipped for scientific investigation, particularly in specific industries."

"The automobile industry saved more than \$10,000,000 last year by salvaging waste materials," Dr. Hamor added. The Association of American Railroads predicted that annual savings of \$2,000,000 would result from development of a chemical to inhibit the corrosive effects of brine from refrigerator cars on equipment, track, and bridges. The California Fruit Growers' Exchange reported that the research department it set up 25 years ago had yielded results that have paid more than \$8,000,000 in direct profits to growers and have led to two byproduct plants.

Many operating industrial research laboratories were increased in facilities and personnel. About \$10,000,000 was spent by the steel industry for industrial research.

"Nearly 2,550 scientists are employed, while close to 1,300 others devote part of their time to investigational activities," Dr. Hamor pointed out. "The steel industry has invested more than \$9,000,000 in providing facilities for research workers.

"Brilliant triumphs are seen among the achievements of applied organic chemists. Their accomplishments are the truest language of synthesis. Several hundred derivatives of the nitroparaffins have been prepared in the laboratory. Nitromethane and nitroethane are likely to be important because they can be converted into explosives. They are said to be good solvents for nitrocellulose and a wide range of natural and synthetic resins."

FRUIT GROWERS BENEFIT

"Parthenocarp, the technique of producing fruit from unpollinated flowers, was benefited by two new growth substances, naphthalene acetic acid and naphthalene acetamide. Much research was carried out on the synthesis of vitamins. More than one-third of the vanillin consumption of the United States is being made from calcium ligninsulfonate. A new synthetic musk was disclosed. Synthetic camphor made from turpentine has broken the monopoly of Japan. Japan herself is producing synthetic camphor on a small scale.

EXHIBIT No. 30

Excerpts from testimony of Robert L. Davison, Director of Housing Research, John B. Pierce Foundation, New York, before the Temporary National Economic Committee, July 13, 1939:

Now, the housing problem is largely a problem because houses cost too much. There are various ways of reducing cost, lower interest rate, city planning, subsidy, and so forth. I don't want to indicate that those things shouldn't be considered, but what I want to discuss here this morning, there are three different ways of reducing the actual cost of the building, whether it be a single-family house or multiple-family house. As I see it, there are three entirely different approaches to this problem. One is the evolutionary approach, gradual improvement of present construction methods and cheapening, reducing costs on existing construction methods,

That will get you part-way down toward the low-income groups. Another method of approach is the pure research I will describe in a few minutes, and the third would be applied research * * * *

* * * there is a tremendous opportunity of pure research in housing * * *. The automobile did not evolve from a horse and buggy * * *. There had to be some real, basic research * * *. The most fantastic thing you could think of, of what might come out of such research, wouldn't be half as fantastic as television * * *. The Government is going to spend hundreds of millions and industry is going to spend billions on housing and yet we are not doing any fundamental research and the possibilities are tremendous * * *.

* * * now as to applied research * * * there are a lot of materials that are commercially available today, or have been made in pilot plants, which could be put into commercial production, that would give you a very much more livable house—and I say livable rather than stronger or anything of that sort—than we have today; at about half the cost * * *.

Excerpts of conclusions relative to the need for technical research in housing as formulated by the Correlating Committee on Technological Developments, President's Conference on Home Building and Home Ownership, 1931:

MEMBERS OF COMMITTEE

George K. Burgess, chairman; director, National Bureau of Standards.

Charles F. Kettering; president, General Motors Research Corporation.

Collins P. Bliss; dean, College of Engineering, New York University.

Willis R. Whitney; director of research, General Electric Co.

Dexter S. Kimball; dean, College of Engineering, Cornell University.

Morris Knowles; president, Morris Knowles, Inc., Pittsburgh, Pa.

Miss Abby L. Marlatt; director, courses in home economics, University of Wisconsin.

Miss Effie I. Raitt; head, department of home economics, University of Washington.

H. L. Whittemore, Secretary; National Bureau of Standards.

The shop fabrication of small houses is one of the most urgent problems which confronts us at the present time. Whether it can be solved satisfactorily, only the future will tell us but its importance justifies a well-directed effort to find a solution. Many of the materials used since time immemorial do not readily lend themselves to shop fabrication and the conservatism of our people as regards housing has not been favorable to simplification and standardization * * *.

Careful consideration of the possibilities of fabricating small houses in the shop leads to the conviction that they can be produced at very much lower cost than houses of the same size are built at the present, probably at half the cost. The very great reduction in cost, due to the shop fabrication of many other structures and machines which are widely used, such as the automobile, supports the belief that shop fabrication of house aggregates may accomplish a very great reduction in cost of houses. For success, it is essential that under competent management, architectural, engineering, and technical experts cooperate to work out the problem * * *.

If the satisfactory small house at much less cost is to become available in the future, careful research work using both scientific and technical experts and equipment must be employed. Lack of satisfactory progress in the past has been due to attempts to improve details without sufficient consideration of the broader aspects of the problem. Usually these attempts have been undertaken by industrial organizations without an adequate scientific or technical staff, progress being made by trial and error.

A satisfactory solution is not to be expected from an industrial organization interested in only one kind of building material. It is desirable that an organization provided with ample funds and having no affiliations with the manufacturers of materials or with the construction trades attempt to provide small houses at low costs.

There are many other references in this committee's report regarding the necessity for technological improvement in the building industry before houses can be built at low costs. The committee was very emphatic in stating that methods of building houses are obsolete, and that the only promise for any considerable reduction in costs lies in more complete shop fabrication, which must be worked out through technical research.

INDEX

	Page
ACOUSTONE: Union installation, jurisdictional agreement; text.....	195
ADAMS, THOMAS, <i>joint author.</i> (See Whitten, Robert)	
AMERICAN CONCRETE INSTITUTE: Research activities.....	105
AMERICAN CONSTRUCTION COUNCIL.....	130
AMERICAN GAS ASSOCIATION: Annual statistics of manufactured gas industry, 1937; cited (n.).....	16
AMERICAN INSTITUTE OF ARCHITECTS: Small house service bureau.....	34
AMERICAN STANDARDS ASSOCIATION: Committee on Coordination of Dimensions of Building Materials and Equipment, program of.....	139
APARTMENT BUILDINGS. (See Rental Housing.)	
ARCHER DEVELOPMENT COMPANY: Archer's suburban life (1939); cited (n.).....	96, 101
ARCHITECT:	
Fees. (See Fees.)	
Function of in home designing.....	
Neglect of low-cost housing field, effect of.....	103
ARCHITECTURAL FORUM:	
First aid for the home owner.....	112, 118
Limited dividend roll call (1935); cited (n.).....	111, 118
AUTOMOBILE INDUSTRY: Number of people engaged in retail distribution of building materials and new automobiles, 1935; exhibit 27.....	200
AUTOMOBILE-TIRE INDUSTRY: Productivity. (See Productivity.)	
BASING-POINT SYSTEM: Building materials.....	61-63
BELL, SPURGEON, <i>joint author.</i> (See Walker, Wallace H.)	
BEMIS INDUSTRIES, INC.: Activities of.....	105
BIGGER, FREDERICK: Site planning (1939); cited (n.).....	99, 101
BLAST FURNACES: Productivity. (See Productivity.)	
BLOUKE, PIERRE: Significance of small-house design (1939); cited (n.).....	109
BOSTON CITY PLANNING BOARD: Report on income and cost survey of Boston (1935); cited (n.).....	98, 101
BRENTWOOD VILLAGE, Washington, D. C.:	
Building costs per room; land, fees, labor, materials, contractor overhead, mortgage, equity; dollars and percent; table 9.....	42
Housing costs per room per month; interest, depreciation, operating, taxes vacancy; dollars and percent; table 9.....	42
Number of dwelling units, land cost total and per unit.....	95
BRICK INDUSTRY: Employment: brick, tile, and terra cotta. (See Employment.)	
BRIGGS BATHTUB CASE.....	65-66
BUCKLEY, GEORGE B.: Report to Cleveland Chamber of Commerce on home-building conditions in Cleveland (1938); cited (n.).....	54, 75
BUILDERS' FEES. (See Fees.)	
BUILDING AND LOAN ASSOCIATIONS:	
Interest rates and.....	80-83
Number and assets in 1937.....	82
Servicing cost of.....	82
BUILDING CODES:	
Effect of on the building industry.....	39
Minimum standards needed to meet requirement of livability; important field for research.....	107
Revision of, recommended program.....	147
Variety in grades, etc., of building materials influenced by building codes.....	61
BUILDING CONGRESSES: Function of.....	130

BUILDING INDUSTRY (*See also* Construction industry):

	Page
Antitrust investigation. (<i>See</i> Building Trades, indictments.)	
Department of Justice program of investigation	140
Employment turn-over	52-53
Lack of—	
Coordination	139-141
Efficient management methods	136-138
Mechanization	133-134
Standardization	138-139
Localization influences:	
Building codes	39
Licensing ordinances	39
Mechanization:	
Average inventory value of equipment in the construction industry; building construction, 1929, indication of degree of mechanization; exhibit 20, table and chart 21	191-193
Lack of	133-134
Obsolete characteristics:	
Due to rules of building trades unions	134-136
Management methods	136-138
Organization of	126-130
1935. Number of people engaged in retail distribution of building materials and new automobiles; exhibit 27	200
1935. Sales distribution of manufacturers in 13 selected named industries; comment and chart 17	184-185
1935. Sales distribution of manufacturers' wholesale branches in 11 selected named kinds of business; chart 19	187
1935. Sales distribution of wholesalers in 10 selected named kinds of business; chart 18	186
Participating groups	32-42
Prices. (<i>See</i> Price Structure; Price System.)	
RFC Mortgage Company's operations	91
References to literature. (<i>See</i> References to Literature, items 17, 22, 29, 43.)	
Research:	
Federal Government's responsibility for technological research in the industry	146
Manufacturing companies' activities	106
Recommended program	146-147
Status of	141-145
Restrictive practices, recommended program	147
Scientific management. (<i>See</i> Management.)	
Standardization. (<i>See</i> Standardization.)	
Tradition, influence of	141
Unfair trade practices:	
Building Material Dealers Alliance, et al. Federal Trade Commission, Cease and desist order 1937. Docket 2191; cited (n.) and text	139, 196-198
California Lumbermen's Council, et al. Federal Trade Commission, Cease and desist order, 1938. Docket 2898; cited (n.) and text	139, 198-199
Collusive bidding practices	69-72
Direct sales practice; opposition activities by competitors' organizations	67-69
Florida Building Material Institute. Federal Trade Commission, Cease and desist order, 1938. Docket 2857; text	199-200
Retail dealer restrictive activities	67-69
Value and volume:	
1925-38. Estimated value of private nonresidential building; total, commercial, industrial, other; dollar amount; comment and table 1	11
1928-39. Volume of commercial buildings, 37 Eastern States; bank buildings, garages and service stations, offices and loft buildings, stores and restaurants, warehouses, total; dollar amount and percent of total, 1928, 1933, 1937, 1939; comment and table 2	12
Variety in grades, kinds, sizes, and designs, effect on prices and costs	61

BUILDING TRADES (*see also* References to Literature, item 30):

	Page
Indictments:	
Cases involved in building investigation of the Antitrust Division of the Department of Justice as of June 13, 1940.....	173-174
Indictments returned and civil suits instituted October 12, 1939-February 23, 1940, in the building industry; exhibit 28.....	200-202
Plasterers. (<i>See</i> Plasterers.)	
Skilled versus unskilled workers, proportion of.....	51
Wage payment:	
Average annual wage payments and percent skilled workers of all wage earners; comment and table 12.....	51-52
Guaranteed annual wage proposal.....	53
Wage rates. (<i>See</i> Wage Rates.)	
BUILDING TRADES UNIONS:	
Agreements between unions and employer organizations. (<i>See below</i> Restrictive practices.)	
Codes of fair competition, plasterers. (<i>See</i> Plasterers.)	
Opposition to labor-saving machinery.....	134
Restrictive practices:	
Acoustone installation, jurisdictional agreement, 1939; text.....	195
Examples of agreement and working rules of union restrictions upon apprentices; exhibit 21.....	194
Plumbers' locals and contractors, Baltimore and Pittsburgh, agreements, 1940; extracts.....	195
Restrictions in output.....	54
Rules of, cause of obsolete and disorganized condition of industry.....	134-136
BURCHARD, JOHN, 2d. Research findings of Benis Industries, Inc. (1934); cited (n.).....	105, 109
BUREAU OF LABOR STATISTICS. (<i>See</i> United States Bureau of Labor Statistics.)	
CARL MACKLEY HOMES, Philadelphia:	
Building costs per room; land, fees, labor, materials, contractor overhead, mortgage, equity; dollars and percent; table 9.....	42
Housing costs per room per month; interest, depreciation, operating, taxes, vacancy; dollars and percent; table 9.....	42
CEMENT INDUSTRY:	
Employment. (<i>See</i> Employment.)	
Pay rolls. (<i>See</i> Pay Rolls.)	
CENTRAL HOUSING COMMITTEE.....	106, 107
Subcommittee on law and legislation. Land title procedure, Walker and Bell report (1936); cited.....	73, 75
CHAWNER, LOWELL J.: Basic factors in trend of construction; cited (n.).....	12, 17
Residential building (1939); cited (n.).....	20, 29
CLEVELAND CHAMBER OF COMMERCE: Home-building conditions in Cleveland; Buckley report (1938); cited (n.).....	54, 75
CODE AUTHORITIES.....	129
CONSTRUCTION INDUSTRY. (<i>See also</i> Building Industry):	
Defined.....	.1
Employment. (<i>See also</i> References to Literature, item 25):	
1938. Number of employers and employees in the contract-construction industry, by classes; exhibit 8.....	180
1938. Distribution of employers and employees in the contract-construction industry, by size of business concern; exhibit 8 and chart.....	180-181
Expansion to a point which will maintain an expanding economy and an increasing population, urgently needed.....	9
Mechanization:	
Average inventory value of equipment in the construction industry by class of establishment: building construction, highway construction and heavy construction, 1929; exhibit 20, table and chart 21.....	191-193
Organization:	
Branch offices of contract-construction establishments, 1929; exhibit 12.....	188

CONSTRUCTION INDUSTRY—Continued.

Organization—Continued.	Page
Distribution of work performed, by location, contract-construction industry: percent in home city, in home state outside of home city, outside home state, 1935; comment and chart 16...	182-183
Place in national economy.....	125-126
Productivity:	
1929-38. Percent of its 1929 income produced each year by the contract-construction industry; exhibit 6.....	179
References to literature. (See References to Literature, items 12, 16, 49, 52, 62, 63.)	
Residential. (See Housing Construction.)	
Trade associations:	
National association, organization efforts.....	130
1929. Membership in trade associations of contract-construction establishments whose volume of business exceeded \$25,000 in 1929; exhibit 13.....	188
1937-38. Number of national and interstate regional trade associations in the construction field by percent which their membership represents in total number of firms in industries covered by them; exhibit 14.....	189
1938. Number of national and interstate trade associations in the construction field, by major industrial groups; exhibit 14.....	188-189
Value:	
1919-38. Value of all construction, dollars per annum; total residential, private nonresidential, public; comment and chart 1.....	2-8
1925-38. Expenditure each year by type of utility; total, railroads, electric railroads, power and light, telephone and telegraph, waterworks, gas plants; dollar amount; comment and table 3.....	14-16
1935. Value of work performed by contract-construction establishments; exhibit 9.....	182
1936-38. W. P. A. expenditures each year; dollar amount.....	16
CONSTRUCTION LEAGUE OF AMERICA.....	130
CONSUMER INCOME. (See Family Income.)	
CONTRACTORS: Social Security Board study of contract construction industry.....	35
Types of contractors and scales of activity.....	35
COSTS:	
Productivity and.....	130-133
Standardization and.....	138-139
Types of costs defined.....	41
COSTS: BUILDING COSTS:	
All costs:	
Federal Home Loan Bank Board index.....	50
Fees.....	72-75
Housing Construction: all costs:	
Purdue University single-family residence project, House No. 1.....	44
Standard 6-room frame house; total costs, material cost, labor cost, and index (1936=100), by months, 1936-39; comment and table 14.....	59-61
Housing construction; financing:	
Percentage reduction in financing costs, effect on monthly carrying charges; comment and chart 11.....	47-48
Housing construction; labor cost:	
Productivity and housing construction cost; exhibit 15 and chart 20.....	189-190
Housing construction; rental housing:.....	44
Costs per room on rental housing: New York (Knickerbocker Village, Hillside), Philadelphia (Carl Mackley), Washington, D. C. (Brentwood Village), Silver Spring, Md. (Falkland), York, Pa. (Elm Terrace); dollars and percent; comment and table 9.....	41-42
Housing maintenance:	
Costs per room per month; interest, depreciation, operating, taxes, vacancy; dollars and percent (same properties as Housing construction above); table 9.....	42
Income, rents, costs relationship.....	22-24

COSTS: BUILDING COSTS—Continued.

Page

Labor costs:

Bureau of Labor Statistics index.....	50
Federal Home Loan Bank Board index.....	50
Percentage of construction costs, effect of wage rates.....	47-59

Land costs:

New York City limited-dividend projects; comment and table 16.....	93-97
--	-------

Materials:

Maximum cost for samples of construction elements submitted for testing in National Bureau of Standards program; comment and table 18.....	106-107
Millwork, design variety element in.....	104

References to literature. (*See* References to Literature, items 12, 13)

COSTS; HOME OWNERSHIP:

Break-down of costs on a \$4,800 house for sale in 1939; comment and table 10.....	43-44
Cost of maintenance, dwelling units; relation of incomes to rents and costs.....	22-24
Net effect upon housing costs of identical reductions in each component; cost of house, cost of land, interest, taxes, depreciation, maintenance, insurance; comment, table and chart 12.....	175-177

COSTS; SERVICE COST. (*see also* References to Literature, items 5, 36):

Tax-income versus service costs; Boston and Cleveland studies; comment and table.....	97-98
---	-------

CURLEY, W. E., *joint author.* (*See* Thompson, Sanford E.)

DAVISON, ROBERT L.:

Excerpts from testimony before Temporary National Economic Committee, July 13, 1939; exhibit 30.....	204
Report on Purdue University experimental housing project, House No. 1; cited (n.).....	44
Testimony before T. N. E. C., 1939; cited (n.).....	99 passim
Traditional, prefabricated and mobile housing (1936); cited (n.).....	40

DEMOLITION. (*See* Housing Construction; urban.)

DENTON, R. HAROLD: Relation of productivity to low-cost housing. Part 2, pp. 119-205, T. N. E. C. Monograph No. 8.

DEPRECIATION: Rental housing..... 45

DIMENSION STANDARDIZATION. (*See* Module.)

DODGE CORPORATION: Construction contracts awarded, 37 Eastern States; monthly; cited (n.)..... 17

EARNINGS. (*See* Wage Payments.)

EDISON ELECTRIC INSTITUTE: Electric light and power industry in United States, 1937; cited (n.)..... 15, 17

ELECTRIC-LAMP INDUSTRY: Productivity. (*See* Productivity.)

ELECTRIC RAILWAYS: Construction expenditure each year, 1925-38, dollar amount; comment and table 3..... 14-16

ELM TERRACE, York, Pa.:

Building and housing cost per room: land, fees, labor, materials, contractor overhead, mortgage, equity; dollars and percent; table 9.....	42
Housing costs per room per month: interest, depreciation, operating, taxes, vacancy; dollars and percent; table 9.....	42
Number of dwelling units, land cost, land cost per unit.....	95

EMPLOYMENT:

Brick, tile, and terra cotta:

1923-39. Index (1923-25=100); chart 7.....	6
--	---

Cement:

1923-39. Index (1923-25=100); chart 8.....	7
--	---

Construction industry. (*See* Construction industry.)

Lumber:

1923-39. Millwork, index (1923-25=100); chart 5.....	5
1923-39. Sawmills, index (1923-25=100); chart 4.....	5

Manufacturing:

1923-39. Durable and nondurable goods group index (1923-25=100); comment and chart 2.....	2, 4, 8
---	---------

Plumbers' supplies:

1931-39. Index (1923-25=100); chart 9.....	7
--	---

Steam and hot-water heating apparatus and steam fittings:

1923-39. Index (1923-25=100); chart 3.....	4
--	---

Structural and ornamental metal work:

1923-39. Index (1923-25=100); chart 6.....	6
--	---

	Page
ENGINEERING NEWS RECORD: Construction Costs, 1937 ed.; cited (n.)	12
EVANS, MERCER G.: Land, materials, and labor costs; cited (n.)	52, 75
FALKLAND PROPERTIES, SILVER SPRING, MD.: Building costs per room: Land, fees, labor, materials, contractor overhead, mortgage, equity; dollars and percent; table 9	42
Housing costs per room per month: Interest, depreciation, operating, taxes, vacancy; dollars and percent; table 9	42
Number of dwelling units, land cost, land cost per unit	95
FAMILY: Defined (census)	21
FAMILY INCOME: Annual income of F. H. A. mortgage borrowers, new single-family homes, 1938; exhibit 3	177
Distribution of nonfarm families by income groups: Total number of families, number of farm and of nonfarm families, percentage nonfarm families, by income groups, cumulative percentage, number of nonfarm families (cumulative), 1935-6; table 7	24
Percent of families in income classes of from less than \$500 to \$3,000 and over, 1935-36; exhibit 4	178
Relation to rents and cost	22-24
FARM SECURITY ADMINISTRATION: Activities of	114
FEDERAL EMERGENCY RELIEF ADMINISTRATION: Housing activities	113
FEDERAL HOME LOAN BANK BOARD: Building costs index	50
Building materials price index; comment and table	59
Functions of home loan bank system	84-86
Lending activities	84
FEDERAL HOUSING ADMINISTRATION: Annual report, 5th, 1938; cited (n.)	24, 27, 29
Functions and operation	86-89
Housing projects: Silver Spring, Md. (See Falkland Properties.) Washington, D. C. (See Brentwood Village.) York, Pa. (See Elm Terrace.)	
Insured loans under title I and II, resp., of National Housing Act	88-89
Mortgage borrowers, annual income, 1938, of F. H. A. mortgage borrowers, new single-family houses; exhibit 3	177
Rental housing operations	90
FEDERAL SAVINGS AND LOAN INSURANCE CORPORATION: Functions of	85
FEDERAL TRADE COMMISSION: Cease and desist orders: Building Material Dealers Alliance et al., docket 2191, 1937; cited (n.) and text	139, 196-198
California Lumbermen's Council et al., docket 2898, 1938; cited (n.) and text	139, 198-199
Cases of building materials retail dealers	139
Florida Building Material Institute, Inc., docket 2857, 1938; text	199-200
FEES: Architects	34
Architects' and builders' fees	72-73
Conveyance	74
Loans	74
Real estate, activity	33
Title procedure and examination, types of	73
FISHER, ERNEST M.: Testimony before House Banking and Currency Committee (1939); cited	87, 91
FORD, JAMES: Slums and housing (1936); cited (n.)	101
FOREST PRODUCTS LABORATORY: Research activities	105, 107
FORT WAYNE HOUSING AUTHORITY (see also References to Literature, item 54): Low-cost housing units	117-118
FOSTER, RAY R., joint author. (See Wickens, David L.)	
GAS PLANTS: Construction expenditure each year, 1925-38, dollar amount; comment and table 3	14-16

	Page
GILBRETH, FRANK B.: Analysis of motion study in the bricklaying trade.....	137
GILL, CORRINGTON: Construction statistics; cited (n.).....	9
GLOSSARY: Construction industry.....	1
Cost.....	41
Family (census).....	21
Household (census).....	21
Lumping.....	37
Productivity.....	131
Public aid to housing.....	111
Public housing.....	111
Slum clearance.....	111
GOVERNMENT RESPONSIBILITY:	
Research in the building industry, recommended program.....	146-147
GRANTS IN AID.....	98
HABER, WILLIAM: Industrial relations in the building industry (1930); cited (n.).....	54, 75
HADDOCK, GEORGE: Patent license agreements in the gypsum industry (1939); cited (n.).....	63, 75
HAMOR, WILLIAM A.: Outlay for research in 1939 (1940); cited (n.) and text.....	143, 202
HANSEN, A. H.: Testimony before T. N. E. C.; cited.....	9, 12
HEATING APPARATUS INDUSTRY:	
Employment. (See Employment.)	
Pay rolls. (See Pay Rolls.)	
HILLSIDE HOUSING, NEW YORK:	
Building costs per room; land, fees, labor, materials, contractor overhead, mortgage, equity; dollars and percent; comment and table 9.....	41-42
Housing costs per room per month: interest, depreciation, operating, taxes, vacancy; dollars and percent; comment and table 9.....	42
Number of dwelling units, land cost, total and per unit.....	95
HOMASOTE COMPANY: Semiprefabricated construction.....	105
HOME OWNERS AND OWNERSHIP:	
Costs:	
All costs:	
Net effect upon housing (owner-occupancy) costs of identical reductions in each component: cost of house, cost of land, interest, taxes, depreciation, maintenance, insurance; comment table and chart 12.....	175-177
Single-family home cost distribution, monthly cost and percent: financing, taxes and insurance, heat maintenance, and repairs; comment and table.....	46-47
Fees.....	72-75
Financing:	
Break-down of costs on a \$4,800 house for sale in 1939; comment and table 10.....	43-44
Government lending agencies.....	83-91
Lending institutions.....	80-83
Mortgages. (See Mortgages.)	
Land.....	93-94
Maintenance.....	22-24
Taxes.....	97
Possession:	
Methods of acquiring a new single-family house.....	31
Ownership and rent.....	27-28
Process of acquiring a home, 1920-30.....	78-80
References to literature. (See References to Literature, items 35, 38).	
HOME OWNERS' LOAN CORPORATION:	
Functions of.....	84
Lending activities.....	84
HOMESTEAD TAX EXEMPTION:	
Origin and development of.....	112
HOUSEHOLD: Defined (census).....	21
HOUSING CONSTRUCTION:	
Apartment buildings. (See Rental Housing.)	

HOUSING CONSTRUCTION—Continued.

	Page
Costs; all costs:	
Productivity and housing construction costs; exhibit 15 and chart 20.....	189-190
Purdue University single-family residence project, House No. 1.....	44
Standard six-room frame house; total costs, material cost, labor cost index (1936=100), by months, 1936-39; comment and table 14.....	59-61
Costs; financing:	
Percentage reduction in financing costs, effect on monthly carrying charges; comment and chart 11.....	47-48
Costs; materials:	
Maximum cost for samples submitted for testing in National Bureau of Standards program; comment and table 18.....	106-107
Costs; rental housing. (<i>See</i> Rental Housing.)	
Design economies.....	103-105
Labor processes required in house construction; exhibit 15 and chart 20.....	facing 190
Nodular. (<i>See</i> Nodule.)	
Multifamily housing. (<i>See</i> Rental housing.)	
Operations reduction:	
Thompson & Lichtner Co. system on project near Baltimore; exhibit 24.....	195
Southwest Portland Cement Co. project in Victorville, Calif.; savings in time percent last of 30 houses on first house by planned operation; exhibit 25.....	196
Plastics. (<i>See</i> Plastics.)	
Prefabricated. (<i>See</i> Prefabrication.)	
Productivity. (<i>See</i> Productivity.)	
References to literature. (<i>See</i> References to Literature, items 4, 7, 8, 9, 31, 32, 45, 59-61.)	
Rental housing. (<i>See</i> Rental Housing.)	
Requirements:	
Current rate of building versus need.....	21
New families, replacement, demolition, number of units, annually (Lubin).....	22
Percent unfit for use, or in need of major repairs (W. P. A.).....	21
Population requirements, various dates up to 1950.....	20
Research in design and materials.....	105-108
Small house service bureau, American Institute of Architects.....	34
Value of construction:	
1919-38. Value of residential construction, dollars per annum; comment and chart 1.....	2, 4, 8
1925-38. Residential and total construction in the United States; value: total and residential, respectively, dollar amount; percent residential to total; comment and table 5.....	19-20
1938. Property valuation of new single-family homes insured by F. H. A.; exhibit 2.....	177
Volume of construction:	
1929-37. Volume of construction index (1926=100); chart 12.....	58
HOUSING CONSTRUCTION; Public. (<i>See</i> Public Housing.)	
HOUSING CONSTRUCTION; RURAL:	
Farm Security Administration activities.....	114
Research activities of Bureau of Agricultural Engineering.....	107
Resettlement Administration activities.....	113, 114
HOUSING CONSTRUCTION; URBAN:	
Demolition, annual average.....	21
Fort Wayne plan.....	117-118
Major participants in the construction of a single-family house in an urban area; comment and chart 14.....	179
Multifamily. (<i>See</i> Rental Housing.)	
Public Works Administration activities.....	114-115
Rental housing. (<i>See</i> Rental Housing.)	
Value of construction:	
1920-39. New nonfarm residential building in the United States, number of units each year; comment and table 6.....	22, 23

HOUSING CONSTRUCTION: URBAN—Continued.

Volume of construction:

Page

1938. Number and value of homes constructed in the United States relative to income groupings: number of nonfarm families, 1935-6, monthly payment in dollars, maximum value of unit at 1 percent per month, number of units built in 1938, percentage of families provided for, life span per unit; comment and table 8.....

24-27

HOUSING MAINTENANCE:

Costs: Owner occupied:

Relation of incomes to rents and costs.....

22-24

Costs: rental housing:

Cost per room per month: interest, depreciation, operating, taxes, vacancy; dollars and percent: New York, Philadelphia, Washington, D. C., Silver Spring, Md., York, Pa.; dollars and percent; comment and table 9.....

41-42

Income and operating expense (per room per month), percent of gross annual income (operating expense, taxes and assessments, interest on mortgages, vacancies), percent profit or loss: 39 New York apartment buildings in 1937; table B.....

150

HOYT, HOMER, *joint author*: (See Weimer, Arthur M.)

HURD, RICHARD M.: Principles of city land values (1924); cited (n.).....

93, 101

INCOME:

Family incomes. (See Family Income.)

National income. (See National Income.)

INDUSTRIAL ECONOMY:

1929-38. Percent of their 1929 income produced by 10 named major industry groups; exhibit 6.....

179

INDUSTRIAL HOUSING:

Private:

Michelin Tire Factories, Clermont-Ferrand, France; 3,000 employee-families housing project.....

136

Southwest Portland Cement Co., Victorville, Calif., 30 employee houses.....

136, 196

Public:

Wartime construction by United States in 1918 and in 1940....

147-148

INSURANCE COMPANIES: Interest rates on mortgage loans.....

80-83

Interest Rate.....

80-83

Building and loan associations.....

80-83

Cost of doing business element.....

82

Federal Housing Administration.....

87-88

RFC Mortgage Company.....

91

Rental housing versus individual home owners' loans.....

83

Risk element.....

81

INVESTMENT: Outlets needed if nation's savings are to result in employment and purchasing power.....

8

JEROME, HARRY: Mechanization in industry (1934); extract.....

191

KNICKERBOCKER VILLAGE, New York:

Building costs per room; land, fees, labor, materials, contractor overhead, mortgage, equity; dollars and percent; comment and table 9.....

41-42

Housing costs per room per month: interest, depreciation, operating, taxes, vacancy; dollars and percent; comment and table 9.....

42

Number of dwelling units, land cost, total and per unit.....

95

KREPS, THEODORE J. Letter of transmittal of Monograph No. 8.....

xiii

LABOR AGREEMENTS: Building trades. (See Building Trades Unions.)

LABOR SUBCONTRACTING.....

37

LAKEWOOD, O.: Families moving away from.....

28

LAMBERT PLAN.....

112

LAND COSTS: Multi-family housing.....

95

References to literature. (See References to Literature, items, 13, 20.)

LEATHER INDUSTRY: Productivity. (See Productivity.)

Single-family homes.....

93-94

LAND REGISTRATION: Torrens system.....

73-74

LENCH, CHARLES H.: Promotion of commercial buildings (1932); cited (n.).....

32, 40, 103

	Page
LENDING ACTIVITIES: Government.....	83-91
Types of institutions.....	80
LEVEN, MAUL DE, and others: America's capacity to consume; cited (n.).....	26, 29
LIMITED DIVIDEND HOUSING CORPORATIONS. Hillside Housing. (See Hillside Housing.)	
Juniata Park Housing Corporation, owner of Carl Mackley Homes. (See Carl Mackley Homes.)	
Land cost, New York City projects; comment and table 16.....	95
Loan insurance provision in National Housing Act of 1934.....	90
National Industrial Recovery Act (1933) provision.....	89
Origin of.....	84
Boston in 1871.....	111
New Jersey, 1933.....	112
Tax exemption.....	111
LOW-RENT HOUSING: Slum clearance versus.....	111
LUBIN, ISADORE.....	
Testimony before T. N. E. C.; cited.....	9
LUMBER INDUSTRY:	
Employment. (See Employment.)	
Pay rolls. (See Pay Rolls.)	
"LUMPING" DEFINED.....	37
McELROY, F. S. Union scales of wages and hours in the building trades (1938); cited (n.).....	75
MAINTENANCE COST. (See Maintenance Housing.)	
MANAGEMENT (see also References to Literature, item 48):	
Building industry:	
Obsolete methods.....	136-138
Recommended program.....	146-147
MASS PRODUCTION:	
Design varieties a deterrent.....	104
Prefabrication and.....	108-109
MATERIAL DEALERS: Types of.....	38-39
MECHANIZATION:	
Building industry. (See Building Industry.)	
Construction industry. (See Construction Industry.)	
References to literature. (See References to Literature, items 21, 26.)	
MEHREN, LAWRENCE: Employment and values in construction, cited (n.).....	8, 9
METALWORK:	
Employment. (See Employment.)	
Pay rolls. (See Pay Rolls.)	
MILLER, JOHN A.: Motorization progress shown by rail and bus route changes; cited (n.).....	14
MILLS, FREDERICK C.: Prices in recession and recovery (1936); cited (n.).....	132
MODULAR SERVICE ASSOCIATION: Activities.....	139
MODULE: Dimension standardization.....	139
Use of in design contribution of Bemis Industries, Inc.....	105
MORTGAGES:	
Federal Home Loan Bank Board, loan functions of system.....	84
Financing procedure, 1920 to 1930.....	78-80
Funds invested in:	
1929, 1937. Amount of urban nonfarm loans each year, by each type of lender in dollars; comment and tables.....	78
1930-37. Funds invested in urban residential mortgages, 1930 and 1937.....	77
Home Owners' Loan Corporation, functions of.....	84
Insurance:	
Annual income of F. H. A. mortgage borrowers, new single-family homes, 1938; exhibit 3.....	177
Federal Housing Administration, functions and operation.....	86-89
Interest rates by types of lending institutions.....	80-83
References to literature. (See References to Literature, item 55.)	
MULTIFAMILY HOUSING. (See Rental Housing.)	
NATIONAL ASSOCIATION OF REAL ESTATE BOARDS: Survey of real-estate business (1933); cited.....	40

	Page
NATIONAL BUREAU OF ECONOMIC RESEARCH: Bulletin 65; cited (n.)	23, 29
NATIONAL BUREAU OF STANDARDS:	
Building materials and structures Reports (1938-39); cited	109
Research activities	106
NATIONAL INCOME:	
1921-37. Index of proportion of national income spent for homes and automobiles; comment and chart 12	178
1929-38. Percent of national income produced by the contract-construction industry; exhibit 6	179
NATIONAL INDUSTRIAL RECOVERY ADMINISTRATION:	
Economic problems of the lumber and timber products industry (1936); cited (n.)	66, 75
Hearing on code of fair competition for builders' supplies trade industry (1934); cited (n.)	66, 75
Rental housing provision under sec. 202, act of June 1933	89
NATIONAL RESOURCES COMMITTEE:	
Consumer incomes in the United States (1938); cited (n.)	24, 29, 178
Housing Monograph Series No. 1 (1939); cited	20, 29
Housing Monograph Series No. 3 (1939); cited (n.)	52, 75, 101, 109
Research—a national resource (1938); cited (n.)	143
NATIONAL SMALL HOMES DEMONSTRATION COMMITTEE:	
Function of	103
NEIGHBORHOODS:	
Obsolescence	96-97, 99
References to literature. (See References to Literature, item 58.)	
NEW YORK STATE. STATE BOARD OF HOUSING: Report, 1937; cited (n.)	84, 91, 95
NEWCOMB, ROBINSON: Home financing in Cleveland (1931); cited	79, 91
PACIFIC COAST BUILDING OFFICIALS' CONFERENCE: Uniform building code (1937); cited	101
PARKER, WILLIAM S.: Report on income and cost survey of city of Boston (1935); cited (n.)	98, 101
PAY ROLLS:	
Brick, tile, and terra cotta:	
1923-39. Index (1923-25=100); chart 7	6
Cement:	
1923-39. Index (1923-25=100); chart 8	7
Sawmills:	
1923-39. Index (1923-25=100); chart 4	5
Lumber:	
1923-39. Millwork, index (1923-25=100); chart 5	5
Steam and hot-water heating apparatus and steam fittings:	
1923-39. Index (1923-25=100); chart 3	4
Metal work:	
1923-39. Structural and ornamental; index (1923-25=100); chart 6	6
PIERCE FOUNDATION: Research specialty of	106
PIPE LINES: Construction expenditure each year, 1925-38, dollar amount; comment and table 3	14-16
PLASTERERS:	
Code of fair competition adopted by Building Contractors Employers Association and Operative Plasterers' and Cement Finishers' International Association, Local No. 60, 1937, Manhattan and Bronx Boroughs, New York City; text	165-172
PLASTICS: Adaptation to low-cost housing	143
PLUMBERS' SUPPLIES:	
Employment. (See Employment.)	
Pay rolls. (See Pay Rolls.)	
PLUMMER, LEIGH S.: Spending habits of nation swinging to larger ratio of durable goods; cited (n.)	23
POWER AND LIGHT PLANTS: Construction expenditure each year, 1925-38, dollar amount; comment and table 3	14-16
PREFABRICATION (see References to Literature, item 10):	
A. O. Smith Co. studies	106
Homasote products	105
Status of	108-109, 142

	Page
PRESIDENT'S CONFERENCE ON HOME BUILDING AND HOME OWNERSHIP:	
Committees on home finance and taxation (1932); cited (n.)	97, 101
Correlating Committee on Technological Developments. Excerpts of conclusions relative to need for technical research in housing (1931)	204-205
Planning for residential districts (1931); cited (n.)	101
PRICE STRUCTURE: BUILDING MATERIALS:	
1910-36. Building materials and all commodities price index; comment and chart 12	58
1929-37. Building materials and all commodities prices; ratio of building materials to all commodities; residential construction; index (1926=100), in semi-annual intervals; comment and chart 12	58-59
1936-39. B. L. S. and Home Loan Bank Board indexes compared; comment and table	59
1937. Prices of each of five principal materials (lumber, cement, crushed stone or gravel, reinforcing steel bars, brick), by States, District of Columbia, and New York City, April 15 and June 15; table C	151-152
Brick; common brick:	
1921-39. Wholesale and retail price per 1,000 brick; chart 4	156
Cement:	
1921-39. Wholesale and retail price per barrel; chart 1	153
Hollow tile:	
1921-39. Wholesale and retail price per tile; chart 5	157
Lime; hydrated lime:	
1921-39. Wholesale and retail price per ton; chart 10	162
Lumber; Douglas fir:	
1921-39. Wholesale (1922-39) and retail (1921-39) price per 1,000 board feet; chart 3	155
Lumber; short-leaf yellow pine:	
1921-39. Wholesale (1926-39) and retail (1921-39) price per 1,000 board feet; chart 2	154
Pipe; cast-iron soil pipe:	
1921-39. Wholesale and retail price per ton; chart 11	163
Sand; building sand:	
1921-39. Wholesale and retail price per ton; chart 9	161
Steel reinforcing bars:	
1921-39. Wholesale and retail price per 100 pounds; chart 6	158
Steel; structural steel:	
1921-39. Wholesale and retail price per 100 pounds; chart 7	159
Stone; crushed stone:	
1921-39. Wholesale and retail price per cubic yard; chart 8	160
PRICE SYSTEM; BUILDING MATERIALS:	
Basing-point system; steel, cement, gypsum	61-63
Price control:	
Briggs bathtub case	65-66
Steel, cement, gypsum, brick, lumber, millwork, plumbing supplies	61-66
PRINGLE HENRY F., <i>joint author.</i> (See Rheinstein, Alfred.)	
PRODUCTIVITY (<i>see also</i> References to Literature, item 44):	
Automobile-tire industry; index of productivity (1914=100), 1914, 1922-31; exhibit 18	190
Blast furnaces:	
Number of establishments, average output per man-hour, wages per ton and per man-hour, 1929; exhibit 16	190
Costs and	130-133
Defined	131
Electric-lamp industry:	
1920-31. Index of productivity, 1920, 1929, 1931 (1920=100); exhibit 17	190
Housing construction:	
Cost and productivity; exhibit 15 and chart 20	189-190
Leather industry:	
1849-1935. Index of productivity (1935=100), 1849-99 in 10-year intervals, 1904, 1909, 1914, 1919-35 in odd years only; exhibit 19	191

	Page
PUBLIC AID TO HOUSING: Defined.....	111
PUBLIC AID TO LOW-RENT HOUSING:	
Homestead tax exemption.....	112
Tax exemption.....	112
PUBLIC CONSTRUCTION:	
1925-38. Expenditure each year: total, State and local construction, construction from Federal grants, direct Federal construction; dollar amounts; comment and table 4.....	16-17
PUBLIC HOUSING (see also References to Literature, item 14):	
Defined.....	111
Fort Wayne, Indiana, Housing Authority.....	117-118
Industrial. (See Industrial Housing.)	
Private capital construction. (See Lambert Plan.)	
Projects and dwelling units constructed by various Federal agencies.....	112-114
United States Housing Corporation.....	112-113
PUBLIC WORKS ADMINISTRATION: Housing activities.....	114-115
References to literature. (See References to Literature, item 51.)	
PURDUE UNIVERSITY:	
Experimental housing project, House No. 1; Davison report cited (n.).....	44
House No. 1, single-family residence, costs.....	44
RAILROADS: Construction expenditure each year, dollar amount; 1925- 38, comment and table 3.....	14-16
REAL ESTATE ANALYST: Cited (n.).....	83, 91
REAL ESTATE BOARD OF NEW YORK: Operative costs for elevator apartment houses (1937); cited (n.).....	76
REAL ESTATE DEALERS: Fees for real estate activity.....	33
Types of.....	33
REAL PROPERTY INVENTORY, 1934-36.....	21
RECONSTRUCTION FINANCE CORPORATION MORTGAGE COMPANY: Function of.....	91
REFERENCES TO LITERATURE:	
(1) American Gas Association: Annual statistics of manufactured-gas industry, 1937; cited (n.).....	16
(2) Archer Development Co.: Archer's suburban life (1939); cited (n.).....	96, 101
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(20) Hurd, R. M.: Principles of city land values (1924); cited (n.).....	93, 101
(21) Jerome, H.: Mechanization in industry (1934); extract.....	191
(22) Lench, Charles H.: Promotion of commercial buildings (1932); cited (n.).....	32, 40, 103

REFERENCES TO LITERATURE—Continued.

Page

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Page

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 Works Progress Administration:
 (62) Construction expenditures and employment, 1925-36; June 1, 1937; cited (n.)----- 1, 2, 9, 15
 (63) Construction expenditures and employment, 1936-38; April 1939; cited (n.)----- 1, 2, 9, 15
 (64) Wolman, Leo: Planning and control of public works; cited----- 9

RENTAL HOUSING:

Brentwood Village. (*See* Brentwood Village.)Carl Mackley Homes. (*See* Carl Mackley Homes.)

Costs:

- Cost distribution: percent interest, depreciation, operation, and maintenance, taxes and assessments; table----- 45
 Costs per room on rental housing: New York, Philadelphia, Washington, Silver Springs, Md., and York, Pa.; dollars and percent; comment and table 9----- 41-42
 Fees----- 75
 Land----- 94-95
 Operating costs----- 45
 Tax costs----- 97
 Depreciation----- 45

Elm Terrace. (*See* Elm Terrace.)Falkland Properties. (*See* Falkland Properties.)Federal Housing Administration projects. (*See* Federal Housing Administration.)Hillside Housing. (*See* Hillside Housing.)

Interest rates----- 83

Mortgages. (*See* Mortgages.)

National Industrial Recovery Act, June 1933, section 202 provisions... 89

Public Works Administration activities----- 114-115

Publicly owned----- 112

References to literature. (*See* References to Literature, item 40.)

Types of initiators of building of----- 32

United States Housing Authority: Origin, functions, and activities... 116

RENTS:

Dwelling units, relation of incomes to rents and costs----- 22-24

Ownership and rent----- 27-28

RESEARCH:

Building industry:

Federal Government's responsibility for technological research in the building industry----- 146

Recommended program----- 146-147

Status of----- 141-145

Housing construction:

Design and materials----- 105-108

President's Conference on Home Building and Home Ownership.

Correlating Committee on Technological Developments. Excerpts of conclusions relative to need for technical research in housing (1931)----- 204-205

Minimum standards needed to meet requirements of livability; important field for research----- 107

Public activities----- 106

References to literature. (*See* References to Literature, items 6, 19, 33.)

RESETTLEMENT ADMINISTRATION: Housing activities----- 113

RESIDENTIAL CONSTRUCTION. (*See* Housing Construction.)

RHEINSTEIN, ALFRED and PRINGLE, HENRY F.: Why slum clearance may fail (1939); cited (n.)----- 111, 118

RUSSELL, HORACE: Legal problems in the housing field (1939); cited (n.)----- 81, 91

SANFORD, E. P.: Wage rates and hours of labor in the building trades (1937); cited (n.)----- 76

SAVINGS BANKS: Interest rates on mortgage loans----- 80-83

SCIENTIFIC MANAGEMENT. (*See* Management.)

	Page
SEARS ROEBUCK PRECUT HOUSES-----	108
SLUM CLEARANCE:	
Defined-----	111
References to literature. (See References to Literature, items 15, 41.)	
SOCIAL SECURITY BOARD: Contract construction industry study-----	35
SOUTHWEST PORTLAND CEMENT CO.: Employee housing constructed at Victorville, Calif.-----	136, 196
STANDARDIZATION:	
Building industry:	
Activities-----	138-139
Recommended program-----	147
Dimension. (See Module.)	
Minimum standards needed to meet requirements of livability; important field of research-----	107
STARRETT, W. A.: Skyscrapers (1928); cited-----	40
STEWART, ETHELBERT: Productivity in the building trades, (1924); cited (n.)-----	137
STONE, PETER A.:	
Experiments with low-cost homes (1932); cited (n.)-----	106
Structural steel and iron fabricating industry, report (1933); cited-----	62
STONE, PETER A. and R. HAROLD DENTON: Toward more housing. T. N. E. C. Monograph No. 8.	
STRAUS, NATHAN: Testimony before T. N. E. C. (1939); cited (n.)-----	97
SUBCONTRACTORS:	
Labor subcontracting-----	37
Scales of activity-----	36-37
SUBSISTENCE HOMESTEADS-----	112-114
TAX EXEMPTION:	
Homestead tax exemption-----	112
Limited dividend corporations and-----	111
TAXES: Tax-income v. service costs, Boston and Cleveland Studies; comment and table-----	97-98
TECHNOLOGICAL DEVELOPMENT. (See Research.)	
TELEPHONE AND TELEGRAPH: Construction expenditure each year, 1925-38, dollar amount; comment and table 3-----	14-116
TEMPORARY NATIONAL ECONOMIC COMMITTEE: Hearings, Part 11. Construction industry (1939); cited throughout	
TERRA COTTA INDUSTRY:	
Employment. (See Employment, Brick.)	
Pay rolls. (See Pay rolls, Brick.)	
THOMPSON, SANFORD E. and CURLEY, W. E.: System can cut building costs (1939); cited (n.)-----	136
TILE INDUSTRY:	
Employment; brick, tile, and terra cotta. (See Employment, Brick.)	
Pay rolls. (See Pay Rolls, Brick.)	
TORRENS SYSTEM: Land-title registration system-----	73-74
TRADE ASSOCIATIONS: Construction industry. (See Construction industry.)	
UNEMPLOYMENT:	
Expansion of construction industry to a point which will maintain an expanding economy and an increasing population-----	9
Investment outlets needed if nation's savings are to result in employment and purchasing power-----	8
UNIONIZATION:	
Building trades. (See Building Trades Unions.)	
UNITED STATES. BUREAU OF AGRICULTURAL ENGINEERING: Rural housing research activities-----	107
UNITED STATES. BUREAU OF FOREIGN AND DOMESTIC COMMERCE: Construction activity in the U. S., 1915-37, 1938; cited (n.)-----	1, 9, 14
UNITED STATES. BUREAU OF LABOR STATISTICS:	
Building materials price index; comment and table-----	59
Handbook of labor statistics, 1936 ed.; cited (n.)-----	190
Union wage rate index for building trades-----	50
Value of material orders placed for prospects financed by Public Works Administration, 1933-39; cited (n.)-----	3

	Page
UNITED STATES CENSUS BUREAU: Construction industry (1936-37); cited.....	40
UNITED STATES DEPARTMENT OF JUSTICE:	
Antitrust Division, cases involved in building investigation as of June 13, 1940.....	173-174
Antitrust Division, indictments returned and civil suits instituted October 12, 1939-February 23, 1940, in the building industry; exhibit 28.....	200-202
Building industry investigation, program of.....	140
UNITED STATES HOUSING AUTHORITY:	
Origin, functions, and activities.....	116
Policy and Procedure Bulletin No. 12. Dwelling unit planning (1938); cited (n.).....	104
UNITED STATES HOUSING CORPORATION: Function of.....	147-148
UNITED STATES STEEL CORPORATION. (<i>See also</i> References to literature, item 56):	
Earnings:	
1904-38. Comparison of net earnings and construction expenditures, index; table A.....	149
1905-37. Earnings and new construction index (average 1925=100); 3-year moving average 1904-38; chart 10.....	13
UTILITIES: PRIVATELY OWNED:	
1925-38. Construction expenditure by types of utilities: Total, railroads, electric railroads, power and light, telephone and telegraph, waterworks, gas plants; dollar amount; comment and table 3.....	14-16
WAGE PAYMENTS (EARNINGS):	
Average annual wage payments and percent skilled workers of all wage earners, each of 16 industrial groups 1929; comment and table 12.....	51-52
Building trades, guaranteed annual wage proposal.....	53
WAGE RATES: BUILDING TRADES:	
Average wage rates of skilled workers and residential building activity 1936: in each of 5 named cities of over 1,000,000; each of 9 named cities of between 500,000 and 1,000,000; each of 9 named cities of 100,000 to 200,000; each of 9 named cities of 25,000 to 50,000; comment and table 13.....	55-59
Labor-cost ratio relationship.....	49
References to literature. (<i>See</i> References to Literature, items 24, 42.)	
Skilled versus unskilled:	
Residential versus nonresidential building; comment and table.....	50-51
Union rates, B. L. S. index.....	50
Unionization, effect on rates.....	50
WALKER, WALLACE H. and SPURGEON BELL: Land title procedure with particular reference to legal costs of home mortgage loans (1936); cited (n.).....	73-75
WEINER, ARTHUR M. and HOYT, HOMER: Principles of urban real estate (1939); cited (n.).....	28, 29
WATERWORKS: Construction expenditure each year, 1925-38, dollar amount; comment and table 3.....	14-16
WHITTEN, ROBERT and ADAMS, THOMAS: Neighborhoods of small homes (1931); cited.....	94, 101
WICKENS, DAVID L.: Financial survey of urban housing; cited (n.).....	83, 91
WICKENS, DAVID L. and FOSTER, RAY R.: Nonfarm residential construction, 1920-36; cited (n.).....	23, 29
WILSON, F. V., JR.: Tomorrow's homes (1939); cited (n.).....	105, 109
WAGNER, PHILIP: Fort Wayne plan (1939); cited (n.).....	118
WOLMAN, LEO: Planning and control of public works; cited.....	9
WORKS PROGRESS ADMINISTRATION (1935-39, June 30):	
Construction expenditures and employment, 1925-36; June 1937; cited (n.).....	1, 2, 9, 15
Construction expenditures and employment, 1936-38; April 1939; cited (n.).....	1, 2, 9, 15
Construction expenditures each year, 1936-38; dollar amount.....	16
WORK PROJECTS ADMINISTRATION (1939-):	
Housing activities.....	117-118
ZONING ORDINANCES: Function of.....	39

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